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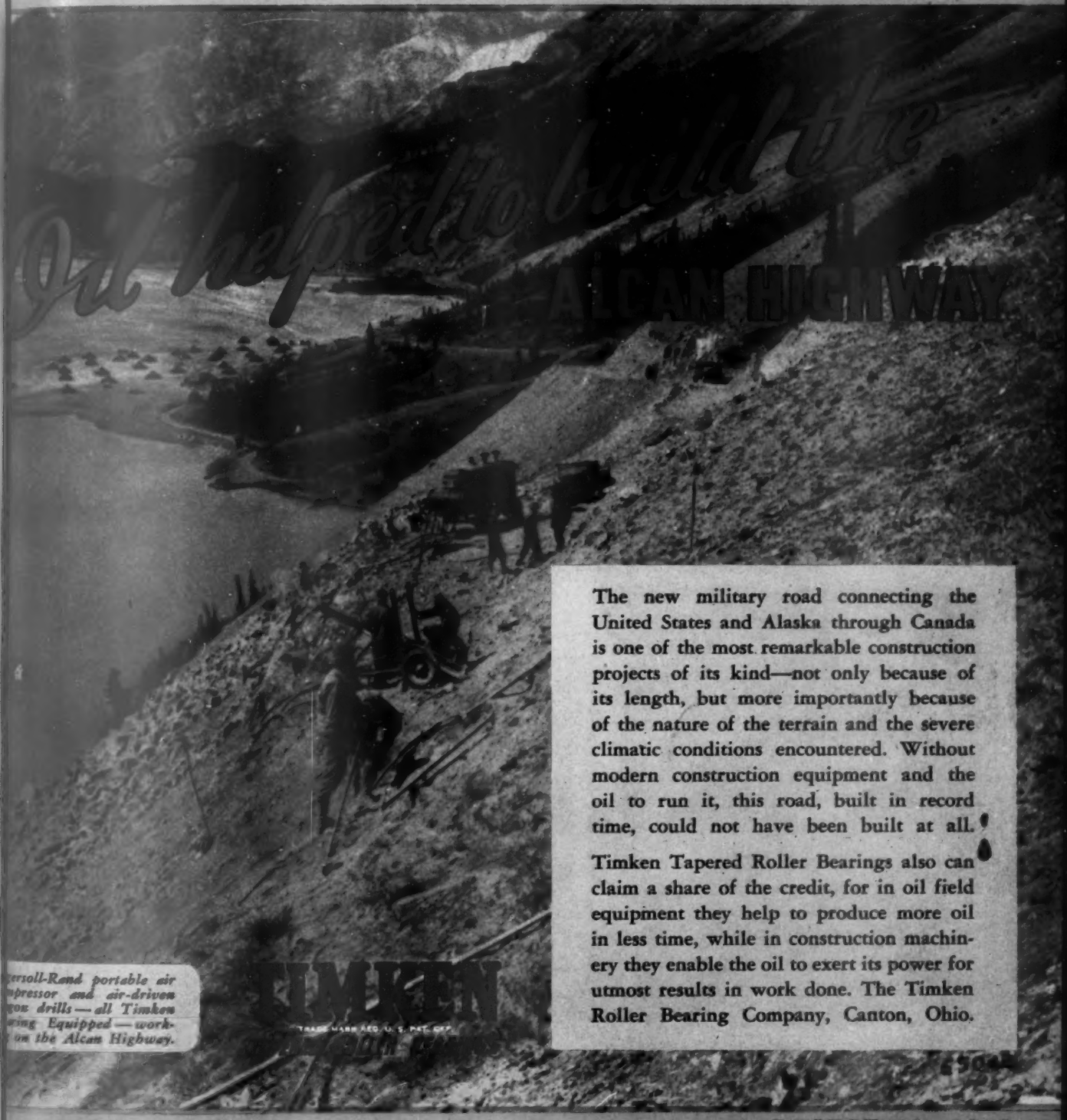
The OIL AND GAS JOURNAL



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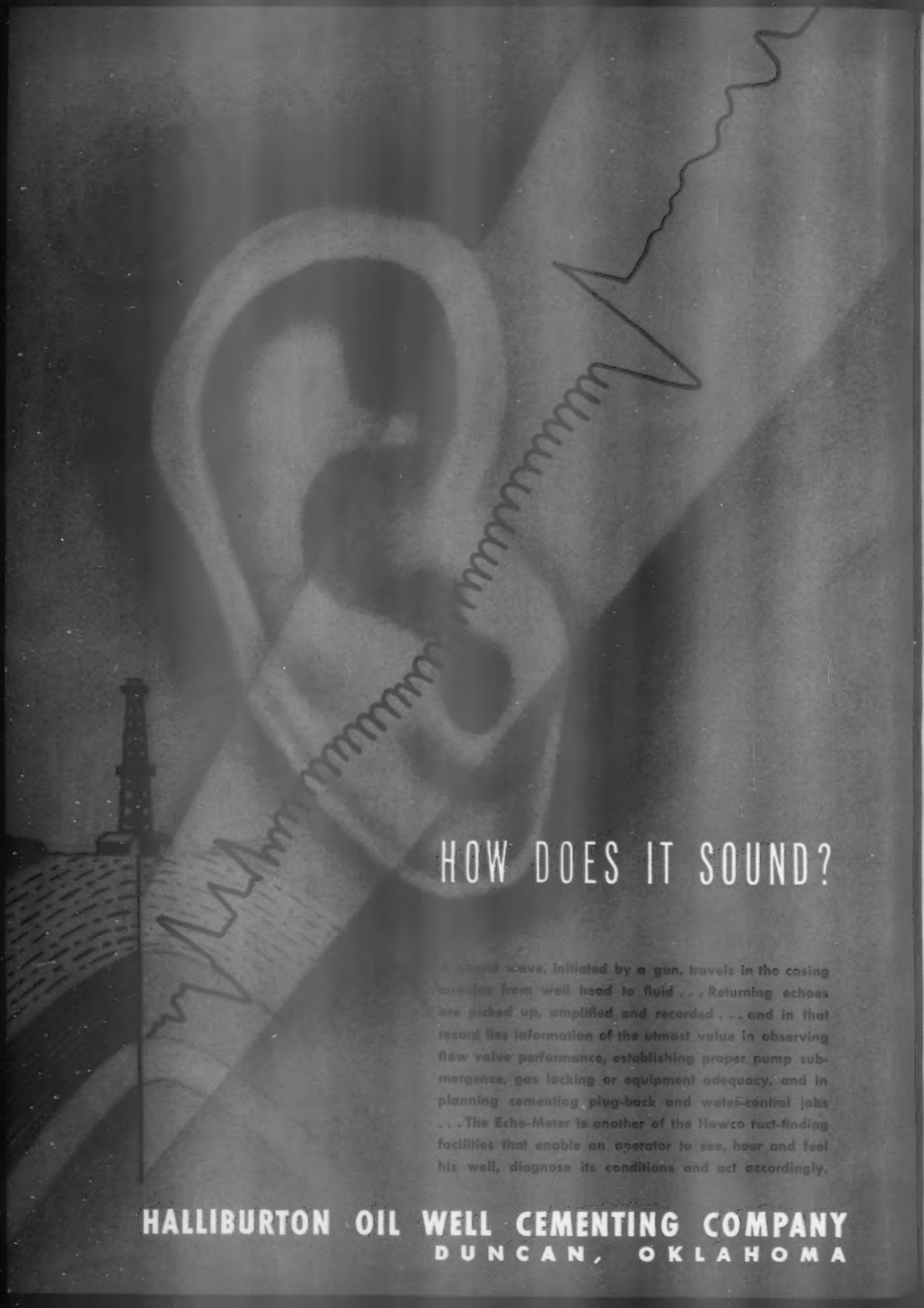
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Table of Contents

NEWS DEVELOPMENTS

Oil Industry Should Benefit From New Manpower Ruling . . . 32
New OPA Regulations Simplify Crude Ceiling Rules . . . 33
Sharper Rationing Instituted in Districts 2 and 3 . . . 34
Illinois Legislature Probes Petroleum Rationing . . . 34
I.P.A.A. Takes Plea for Higher Prices to Congress . . . 36
Carter Succeeds Minckler as Supplies Director of PAW . . . 36
Margin Between Gasoline Demand This Year and Last Narrows . . . 36
September Certifications Establish New Record in Production . . . 37
R. B. Kelly Is Named Production Director of District 2 . . . 37
Industry Vigorously Refutes "Steal" Charge . . . 38
Deaths . . . 38
Postwar Aviation Demand . . . 40

Trends . . . 31
This Week . . . 35
Federal Order Digest . . . 38
Editorial . . . 39
Refining News . . . 82
Natural-Gas News . . . 84
Natural-Gasoline News . . . 84
Pipe-Line News . . . 86

ENGINEERING—OPERATING

Benefits of Slow Pumping Rates . . . 49
Reforming Refinery Still Gases for Market Consumption . . . 52
Oil-Well Pumping Practices—No. 8 . . . 60
Questions on Technology . . . 66
Hot Reflux to Still Improves Plant Operation . . . 68

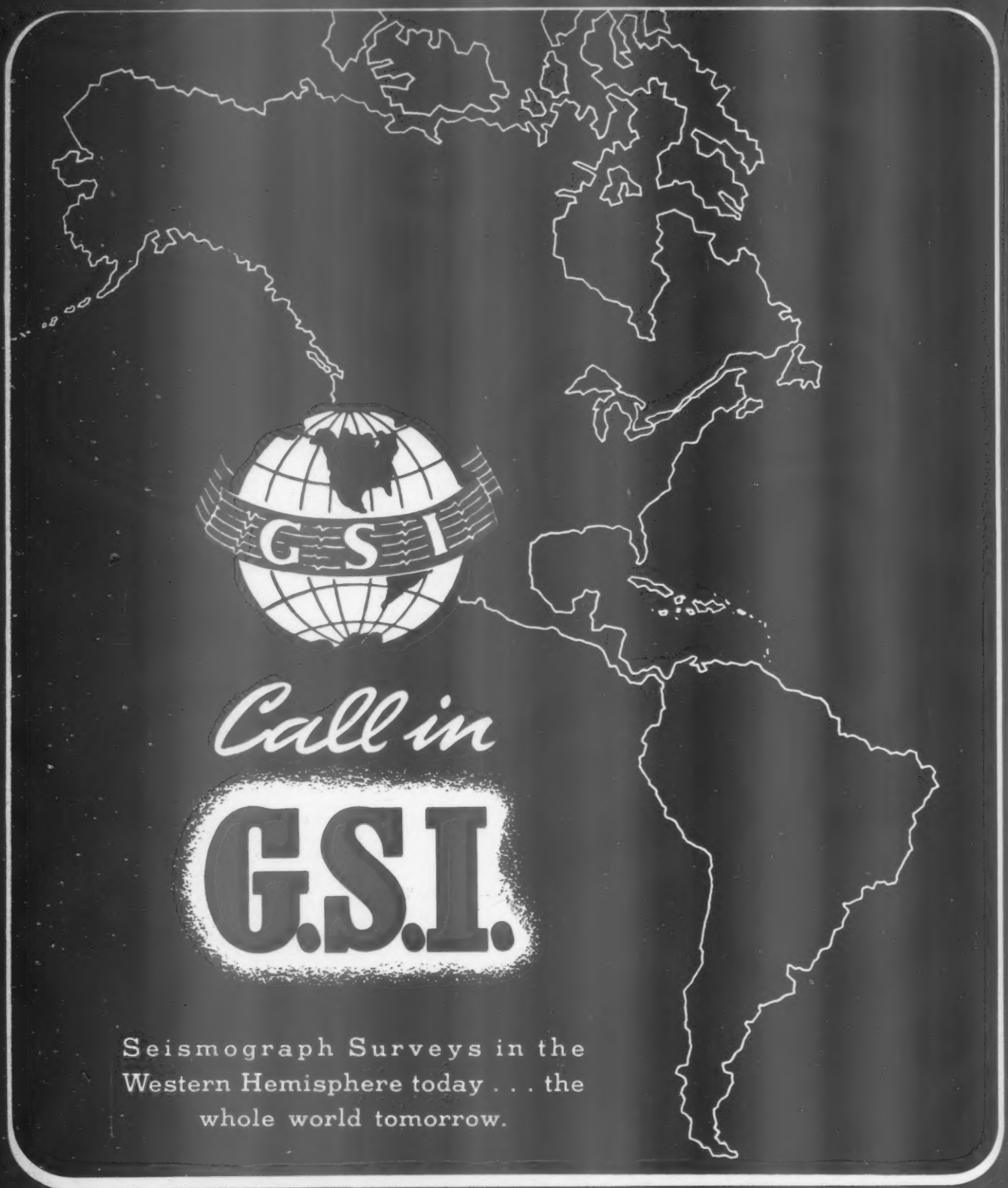
Operating Ideas . . . 70
Cost Engineering . . . 73
Eng. Fundamentals . . . 75
Journalog . . . 77

EXPLORATION AND DRILLING

Week's Highlights . . . 89
Completions in All Fields . . . 89
Daily Average Production for Week . . . 90
Reports by Areas Start on Page . . . 90
Completions and Drilling Wells Increased in July . . . 105

ADDITIONAL FEATURES

Drilling Contractors . . . 108
Personals . . . 111
Market Developments . . . 114
Refinery Prices . . . 115
Tank-Wagon Prices . . . 115
Equipment Progress . . . 116
Classified Advertising . . . 117
Calendar of Events . . . 120
Journalisms . . . 120
Advertisers' Index . . . 120



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Trends

Crude-Oil Production
By States — Page 90

CRUDE PRODUCTION 4,258,585 bbl. daily average—up 50,560 bbl. One year ago 3,923,865 bbl.

CRUDE STOCKS 237,382,000 bbl. as of Aug. 7—down 1,038,000 bbl. One year ago 246,975,000 bbl.

GASOLINE STOCKS 73,368,000 bbl. as of Aug. 7—down 1,609,000 bbl. One year ago 79,559,000 bbl.

RESIDUAL FUEL-OIL STOCK 66,714,000 bbl. as of Aug. 7—down 163,000. One year ago 78,316,000 bbl.

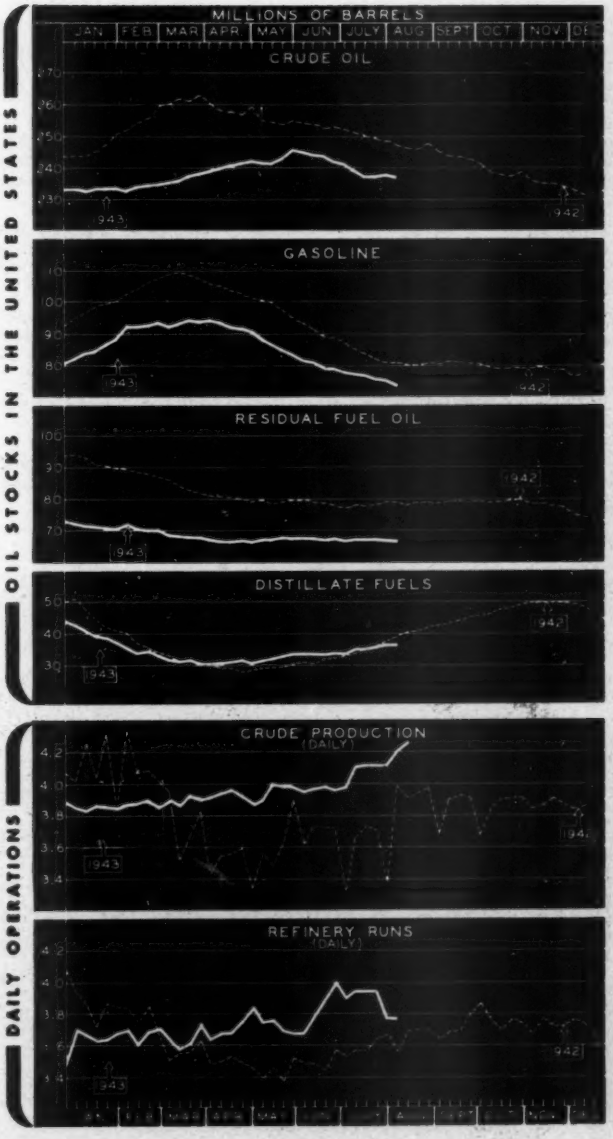
GAS OIL AND DISTILLATES 36,344,000 bbl. as of Aug. 7—down 19,000 bbl. One year ago 39,372,000 bbl.

REFINERY RUNS 3,776,000 bbl. daily week ended Aug. 7—down 12,000. One year ago 3,574,000 bbl.

GOVERNMENT direction of petroleum operations in its attempt to balance future supplies and demands is working two ways based on orders and recommendations of the past week. PAW has recommended to the states a daily production of petroleum liquids of 4,552,100 bbl., an increase of 127,500 bbl. daily over August and a record output for domestic operations. At the same time an OPA order effective Monday substantially reduced civilian gasoline in Districts 2 and 3 by reducing the value of A, B and C coupons from 4 to 3 gal.

THE magnitude of the domestic operations in prospect for next month can best be visualized by comparisons with previous operations. The allocated production of 4,552,100 bbl. daily in September is 207,100 bbl. daily or 4.7 per cent greater than the total liquid production in December 1941, the month in which this country entered the war and the record operating month up to that time. With the production of natural gasoline and related products estimated at 245,000 bbl. daily the PAW recommendation points to an average daily production of domestic crude oils next month in excess of 4,300,000 bbl. with crude runs to stills at refineries to average 4,000,000 bbl. daily. Fields in Texas, principally in West Texas, will be called upon to increase their production 92,000 bbl. daily. It is said that a method of transporting this additional crude oil has been worked out involving the use of pipe-line capacity now partially idle coupled with the use of water transportation facilities. Indicative of the fact that District 3 has the only surplus crude oil available, the September allocations for the other districts, except for a 5,000-bbl. daily increase in California, were practically the same as for August.

WHILE the primary motive in reducing gasoline supplies in Districts 2 and 3, is to make more gasoline available in District 1 and thus bring about a better equalization of rationing in the three districts, official statements indicate that the national shortage was also a factor in the decision. It is pointed out that most refiners in Districts 2 and 3 are behind in their gasoline shipments so that the reduction in civilian requirements, only part of which will be shipped to District 1, will enable refiners to catch up in their orders. Later it is hoped that the gasoline yields in Districts 2 and 3 can be reduced for the purpose of increasing the supplies of all grades of distillate and fuel oil.



Oil Industry Should Benefit From Changes in Selective Service Rules

War Manpower Commission establishes list of critical occupations. Workers possessing such skills to lose occupational-deferment claim unless they get into war industry or supporting civilian activity by October 1. The WMC list raises a large variety of jobs in the oil industry from an "essential" to a "critical" and therefore a preferred basis.

WASHINGTON, D. C.—Changes in the rules for inducting men under the Selective Service System as announced by the War Manpower Commission are intended to hold essential workers to war-useful jobs if they are so employed now; to assure transfer of workers to jobs aiding in the war effort; and to supply men needed for the armed forces without cutting war production. These changes may prove to be beneficial to the oil industry which is today suffering from a manpower shortage.

Along this line, the first step taken by the commission was the establishment of a list of critical occupations covering skills urgently needed in the war effort. Workers possessing such skills must get into war industry or supporting civilian activities by October 1 or lose further claim to occupational deferment. This list does not replace the existing lists of essential activities and occupations but its purpose is to search out particular skills and to see that they are so employed as to speed victory, whether their employment is in industry or in the military services.

Included in the list of critical occupations are the following:

PART 1
Production and Service Occupations

Catalytic-converter engineer, synthetic rubber
Cementer, oil well
Computer, electric, seismic or gravity
Continuous-still engineer, synthetic rubber
Driller, oil well, cable or rotary
Foremen*
Observer, seismic
Oil-well gun perforator
Oil-well treater, acidizing
Pumper, refinery (in charge)
Purification engineer, synthetic rubber
Reactor engineer, synthetic rubber
Stillman, petroleum processing

Among other oil-industry occupations, drillers, both cable tool and rotary, have been placed on the critical-occupation list by War Manpower Commission

PART 2
Professional and Scientific Occupations

Chemist
Engineer, petroleum
Geologist
Geophysicist
Seismologist

*Limited to those who use in their jobs the skills of one or more occupations in this list or supervise men working in essential industries where the supervision involves extensive knowledge of the work and training of two or more years.

This list thus raises a large variety of jobs in the oil industry from an "essential" to a "critical" and, therefore, a preferred basis.

Selective-service boards have been instructed to give more consideration than ever before to occupational deferment, dependency deferment having passed more or less into the background.

New standards have been set up for permitting the transfer of civilian workers from job to job which are based on experience under employment stabilization plans and will be written into all such plans by October 15. They are intended to stimulate transfer from less essential into more essential war jobs and to reduce unnecessary shifting of workers.

Finally, the list of nondeferrable activities and occupations has been extended but this list is of little interest to the oil industry as it affects few of its employes. The categories are, however, broad and include such jobs as car washer, elevator operator and starter, errand boy, messenger, office boy and receptionist regardless of the activity in which they may be found. These are first on the list for induction into the armed services regardless of dependents. Although workers whose occupations are included in this list are able to ensure some deferment by transferring to more essential jobs, the skills involved are such as to promise little hope for recruiting men for critical jobs in industry from this group.

Persons qualified in critical occupations, if not engaged in essential activities will be asked by the U. S. Employment Service to fill needed jobs. They will be placed in these jobs and may be hired only "upon referral by or with the consent of the U. S. Employment Service." It has been pointed out by Chairman Paul V. McNutt that standards governing the transfer of workers will be uniform in that they will apply to all

transfers, whether at a higher rate of pay, a lower rate of pay or at the same pay. The measure of a transfer is whether it will serve the war effort.

Workers in the newly announced group of critical skills may not be hired merely on the presentation of a statement of availability but only through the USES. At the same time, the migration of workers is controlled as referral to USES is necessary in the case of workers who have not lived or worked in the locality during the preceding 30-day period. Thus workers leaving their community to seek employment elsewhere may find themselves ineligible for employment in the new locality.

The provisions governing the transfer of civilian workers are not greatly dissimilar to those applied in most local employment stabilization plans today. Moreover, they do not apply to any person until acted upon by the area war manpower director and incorporated into the local stabilization plan. Selective-service boards are, however, informed that the occupations appearing on the critical list are those most urgently needed in war industry. For this reason, local boards are instructed to give particular and grave consideration to the deferment of registrants having these critically needed skills.

Local Board Determines Status

The inclusion of a registrant's name on the list of essential activities and occupations does not conclusively determine his occupational status. The question to be determined by his local board in consultation with USES and other agencies is whether he is needed in his current occupation in support of the war effort.

Workers last employed in critical occupations may be hired only in jobs to which they are referred by USES. Likewise, no employer may hire a worker for a job in one of these occupations unless the worker has been referred to him by USES. This control is necessary to insure that workers with critical skills will be used in those jobs in which they are most needed. It is also presumably designed to prevent the hiring of men in critical occupations when other more qualified men are available. These provisions are irrespective of statements of availability of previous employers in the case of workers in critical occupations.

Not mentioned in the changes in rules are the cases of skilled workers in oil or other industries who have left their jobs for others in war plants which may not now be on the critical list. It is implied that efforts will be made, however, to return such men to their work if the shortage continues, provided the work they would be doing in the oil industry is more essential than that which they are doing now, regardless of differences in pay.

New OPA Regulations Are Designed to Simplify Rules For Crude Price Ceilings

THE new regulations of the Office of Price Administration effective August 19 are designed to simplify rules for the determination of price ceilings for producers of crude oil and natural gas and do not involve any changes in the general price structure. The new procedure should end the confusion that has existed in regard to the ceiling prices applying to certain fields. In the case where several companies are purchasing in an area it has been the practice for each purchaser to pay the schedules in effect October 1, 1941. It has been assumed that each purchaser had to pay the same prices on any crude that became available from new leases. Under the new regulations where there are no specific prices each purchaser is permitted to pay the highest prices prevailing for that grade of crude oil in a particular area on new purchases.

All sections of the new regulations dealing with ceilings of these products have been removed from Revised Price Schedule 88 (petroleum and petroleum products), and, after being brought up to date and simplified, have been embodied in the new regulation, Maximum Price Regulation 436 (crude petroleum, and petroleum and natural gas).

OPA plans within the next few weeks to issue two other new regulations in a further breakup and overhauling of Revised Price Schedule 88, one to cover gasoline and fuel-oil maximum prices, the other ceilings for lubricating oils, greases and other processed products.

Five Improvements

Five improvements have been accomplished by the issuance of the new sections on crude petroleum. They are:

1. Producers of these products do not have to go through sections dealing with other petroleum products to find their ceilings and accompanying provisions.

2. Various sections which have become obsolete have been removed.

3. Where specific dollars-and-cents ceilings have been provided on crude oil, they are set forth in the new regulations by states and arranged alphabetically, with the various pools and fields clearly headed. This makes for ready reference. The specific prices are the same as existed in Revised Price Schedule 88.

4. Certain inequities which existed in the previous schedule have been rectified. These adjustments are of a minor nature.

5. The formula to be used where no specific ceilings are set follows immediately after the spelled-out ceilings and has been modified to promote uniformity in pricing, but this will affect a very small percentage of producers.

Sections dealing with petroleum and natural gas follow the major part of the new regulation which is devoted to crude petroleum. One section deals with wet gas, the other with dry gas. These sections are lifted from Revised Price Schedule 88 without any substantial changes.

Correct Inequities in California

One of the inequities corrected in the crude-oil sections is in California where fields that had no posted prices formerly based their ceilings on the posted prices of other fields. When OPA established specific prices for certain fields it affected this practice. The new regulation permits resumption of the former practice when data is supplied, OPA supporting the action.

Where there are no specific prices set for crude oil, the formula hitherto has provided that the ceiling shall be the October 1, 1941, posted price. Where more than one posted price existed on that date, the maximum price could be set from the price paid at any receiving tank of the same producer as of October 1, 1941, but if this price was shown to be below the lower or lowest posted purchase price, the lowest posted price was the maximum price. In the interests of uniformity with other sections of the regulation, this proviso has been changed so that where the price is shown to be below the highest of the posted purchase prices then the maximum price is the highest posted price. This change will affect less than one-half of 1 per cent of the total production of crude oil as practically all ceilings are based either on specifically set maximum prices or where uniform posted prices existed October 1, 1941.

Sharper Rationing Instituted In Districts 2 and 3

WASHINGTON, D. C. — The first step in the long-awaited government program of equalizing gasoline rationing and solving a national shortage problem became effective at 12:01 a.m. August 16 when the value of A, B and C coupons in Districts 2 and 3 were reduced from 4 to 3 gal. No changes were made in Districts 4 and 5 and in District 1 the 1½-gal. coupon continued in effect.

Statements by officials of the Office of Price Administration indicated that by September 1 the ban on pleasure driving in District 1 could be lifted and the value of the ration coupons increased to at least 2 gal. It was also explained that an investigation was under way in Districts 4 and 5 to determine supply conditions now and later in the year with the possibility that the reduction in coupon values would later include these Rocky Mountain and West Coast states.

The first objective of the new ration plan is to increase supplies in District 1 and if these are sufficient to justify the action the drastic rationing of civilian use in that area will be liberalized. The new allocation for District 2 is 480,000 bbl. daily and for District 3, 140,000 bbl. daily or 15 per cent below the civilian consumption in June. It is said that these allocations will permit an additional 50,000 bbl. daily to be shipped into District 1 from the two adjoining districts.

It was also announced that old-type B and C gasoline ration books will be recalled in the near future. Books with new-style coupons will be issued. This move is designed to discourage counterfeiting and also to halt the use of invalid coupons from expired books.

Even though Districts 2 and 3 were cut from 4 to 3 gal. per coupon, no relief has been granted the East, though it was indicated a slight increase may be in sight. New curtailment attributed to continued decline in automotive-fuel inventories and impending general shortage.

In explanation of the reduction in coupon values Petroleum Coordinator Ickes said:

"The transportation difficulty, after months of struggle, has now been overcome. There is, therefore, no reason why the East should not be placed on a parity with the rest of the country."

National Shortage

Pointing out that the only curtailment of civilian gasoline consumption that has been in effect outside of the East heretofore has been that recommended by the rubber director for the purpose of saving tires, Administrator Ickes commented:

"The military requirements have become so large—and they are still mounting—that the only way that we can meet war demand, plus the demand for war industry and essential civilian operations, is to call for a larger contribution from areas outside of the East.

"The reason why reduced civilian consumption of gasoline is necessary in the Middle West and Southwest is, fundamentally, an already existing shortage of crude oil in the Middle West, and an impending shortage over-all brought to a head in both cases by the huge military requirements for petroleum products.

"There has been, moreover, a serious and continuous decline in automotive gasoline inventories in both the Middle West and Southwest—a decline which will continue as more and more of each barrel of crude goes into the making of war products, such as 100-octane aviation gasoline, toluene for TNT, butadiene for synthetic rubber, and fuel oils for war plants and for the rapidly growing Navy and Merchant Marine."

Other Features

In addition to the cuts in A, B and C coupons the curtailment in PAW Districts 2 and 3 will include:

1. The maximum allotment of gasoline for in-course-of-work driving, except for those entitled to preferred mileage (C books), will be reduced immediately from 720 miles a month to 480 miles a month.

2. Motorcyclists will have their D rations cut in proportion to the cuts in passenger-car rations. This will be done by extending the valid period of the basic D ration through November 11, 1944. These books were previously scheduled to last only through next July 21.

In reducing the value of A coupons in the Midwest and Southwest, OPA is also reducing somewhat the amount of occupational driving in the A book from 150 miles to 60 miles, while increasing the amount of family, or nonoccupational, driving from 90 miles to 120 miles.

A bookholders who require more than 60 miles a month of occupational driving will be eligible for necessary supplemental mileage through B or C rations. B and C bookholders who are unable to meet their occupational driving needs with the reduced coupons may apply to their War Price and Rationing Boards for a restoration of mileage lost.

The new gasoline rationing program will not affect necessary commercial motor vehicle operations in the Middle West, Joseph B. Eastman, director of the Office of Defense Transportation, declared.

At the same time Mr. Eastman announced that a supplementary allotment of 14,000 bbl. of gasoline per day has been granted by the PAW to the ODT for transportation facilities and services under its jurisdiction in the East Coast shortage area. The allotment, which is now effective, will make possible the orderly restoration of necessary commercial motor vehicle operations along the eastern seaboard.

Illinois Legislature Probes Petroleum Rationing

SPRINGFIELD, Ill.—A joint legislative commission has been investigating petroleum rationing, during which investigation oil men have been presenting their views. C. Hayden Davis, president of Pana Refining Co., told the commission that federal orders limiting wells to one in 40 acres has done more to cause the stacking of rigs in Illinois than anything else. He added that in his opinion a rise in price won't help production like removing restrictions and even paying a bonus for wildcatting.

"Drafting of skilled oil production workers in Illinois has done as much to retard oil production as price control," Rep. J. L. Wellington told the commission.

Illinois output could be boosted substantially if the federal Government would ease its present regulations governing drilling equipment, well spacing and manpower, Dr. M. M. Leighton, chief, State Geological Survey, told the commission. He also stated his belief that an increase in the price of crude oil would help. He estimated that the state's gasoline consumption is now about 45 per cent below prewar levels.

THIS WEEK

TRANSPORTATION—First link of "little inch" line in Northwest Territories which is to connect Fort Norman field to Whitehorse, Alaska, now operating . . . supplying project camps. . . . ¶One of the largest gasoline lines serving Middle West and Mid-Continent prepares to ship heavy products because of expected decline in gasoline deliveries under more severe rationing. . . . ¶Major company seeks to parallel existing pipe line from West Texas to East Texas terminal of 24-in. line with a new 12-in. artery. . . . ¶Contract let for 250-mile 24-in. natural-gas line from Hugoton, Kans., to Blackwell, Okla. . . .

PRODUCTION—PAW seeks daily production of petroleum liquids in September of 4,552,100 bbl. . . . increase of 121,900 bbl. daily over August and largest in history. . . . Practically all of increase to come from District 3. . . . West Texas fields will supply most of increase for that state. . . . Combination pipe line and water movement arranged. . . . ¶Domestic production last week highest since January 1942. . . .

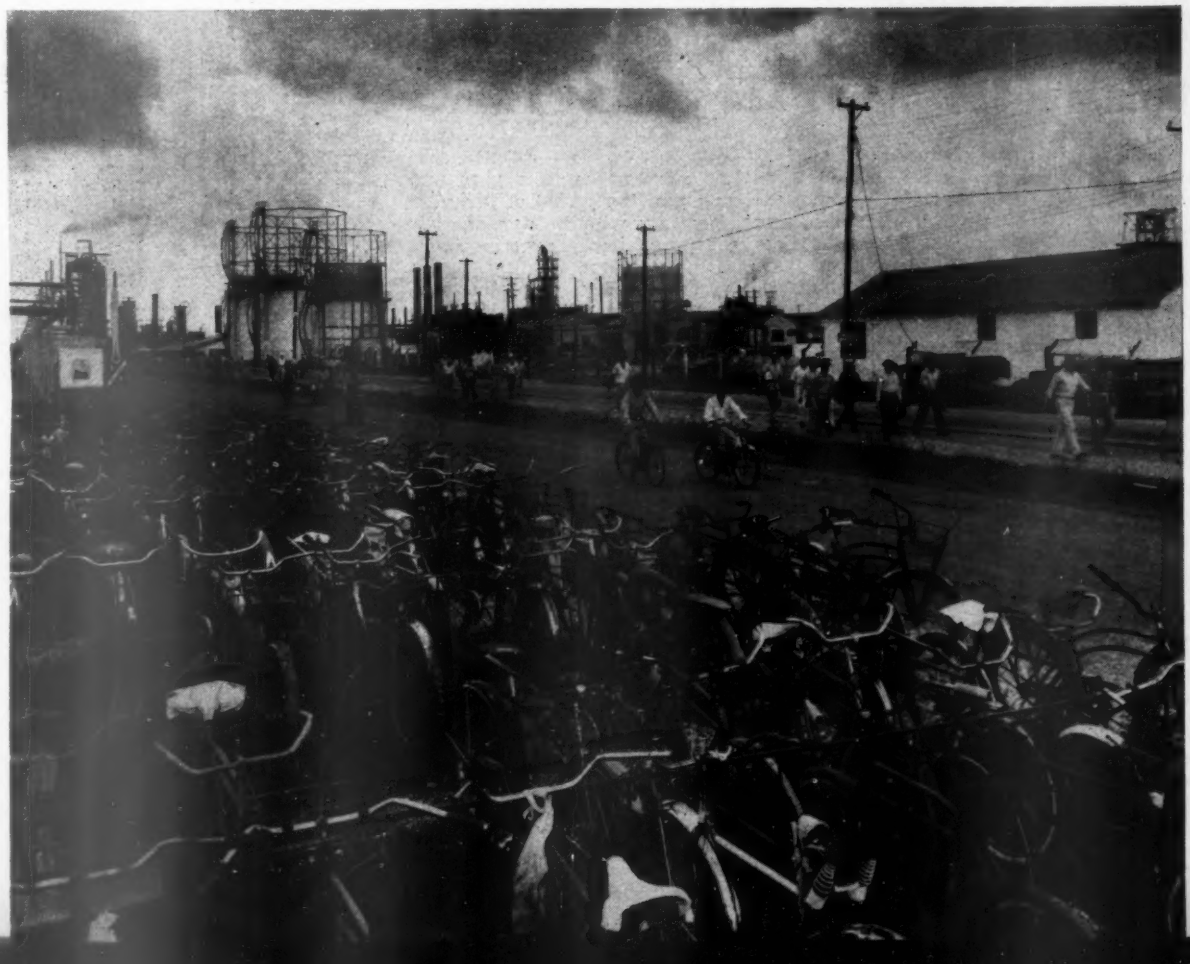
REFINING—Recent reductions in crude runs to stills in part reflects Gulf Coast storms. . . . Expanded operations in prospect for remainder of month with all-time record assured for September. . . . ¶District 1 refiners asked to increase yields of furnace oils and 80-octane all-purpose gasoline. . . . ¶First crude reaches eastern terminal of 24-in. . . . Distribution to several eastern refineries to start immediately. . . .

PRICES—OPA order effective August 19 removes crude-oil price ceilings from Revised Price Schedule 88 and establishes Maximum Price Regulation 436. . . . Ceiling rulings simplified and brought up to date . . . involves no changes in general price structure. . . . ¶OPA's Labor Policy Committee charges big oil companies with an attempted "steal" in proposed 35-cent advance in crude-oil schedules. . . . Statement roundly condemned by operators. . . . ¶I.P.A.A. says remedies for petroleum's price and other problems lie in congressional action. . . .

MANPOWER—Selective Service System changes should aid in solving oil industry's critical manpower situation. . . . Many field, pipe-line and refining occupations have "critical" rating giving industry preferred position. . . . Representatives of supply companies and manufacturers seeking higher ratings for key employes. . . .

RATIONING—Long-expected reduction in A, B and C gasoline coupons in Districts 2 and 3 effective August 16 . . . no immediate relief in District 1 but lifting of pleasure ban expected September 1. . . . PAW and OPA explain coupon reductions necessary not only to equalize rationing but to conserve national supplies. . . .

This week's degradation of gasoline coupons in the Southwest and Middle West holds no qualms for scores of employes at Standard Oil Co. of Louisiana's Baton Rouge refinery where scores of bicycles are used to reach the plant and different parts of the operation



I.P.A.A. Takes Plea for Higher Crude-Oil Prices to Congress

OKLAHOMA CITY, Okla.—The aid of Congress will be enlisted in obtaining higher oil prices by the Independent Petroleum Association of America, whose executive committee voted such a measure at a special "war council" meeting here August 16.

The committee, asserting that the oil shortage is the nation's most serious wartime problem, appealed to Congress to override the OPA which has stubbornly failed to heed pleas for a higher price for oil.

The meeting was held just a few hours after reductions in Midwest and Southwest gasoline rations went into effect, and those present agreed that further restrictions were in prospect unless OPA granted higher prices to permit drilling for new supplies.

The resolution declared that gasoline rationing is due to an insufficient supply of crude oil, which shortage is the result of a price policy now in effect in the United States.

"This price policy was first imposed by major oil companies and had been in existence for a period of years prior to our entrance into the war.... The present price administration has accepted this arbitrary price base as a permanent price policy."

The resolution further asserted that producers, because of soaring costs, could not drill for new oil supplies at present prices and pointed out that for 5 years the rate of discoveries had declined at an alarming rate.

"The inevitable result of such a (price) program," it said, "is the certain shortage of petroleum to supply not only civilian demands but to meet our war requirements as well.

"The continuance of the present policy means that the civilian population must be exposed to not only present rationing regulations but constantly increased restrictions."

The resolution declared that unless the trend was reversed, gasoline rationing might have to be continued into the postwar period.

Frank Buttram, president of the association, presided at the meeting.

Carter Succeeds Minckler As Director of Supply Division of PAW

HARVEY D. CARTER, president of Oil Trading Co. of New York, and South Shore Oil & Development Co., has succeeded Robert L. Minckler as director of Supply Division of the Office of Petroleum Coordinator. Mr. Carter was recently named District 1 director of the division of which he now becomes national head.

H. D. CARTER

Mr. Carter has been engaged in shipping and marketing activities since the close of the other World War during which he served with the Navy. He is the principal owner of the companies whose activities he has directed in recent years. His oil experience includes a period in which he was assistant to the president of Pierce Oil Corp.

Mr. Minckler, whose activities with PAW have been highly commended, will return to General Petroleum Corp., Los Angeles, Calif.

Margin Between Gasoline Demand This Year and Last Continues to Narrow

THE margin between domestic gasoline consumption this year and the corresponding period of last year continued to narrow in May, the latest report available covering consumption by states. For the entire country the decrease in gasoline consumption this May compared to May 1942 was only 10.8 per cent. This compares with a decrease of 14.1 per cent in April compared to April 1942 and 19.9 per cent for the first 4 months of this year.

As in previous reports the May data show a wide variation in gasoline-consumption trends by states and by districts. In general the trend is toward smaller decreases in states showing decreases with greater increases in states reporting more consumption than they did the year previous. Most of the decline for the entire country is accounted for in Districts 1 and 2 with Districts 3 and 5 showing greater consumption this May than in May 1942.

While there are exceptions to the rule, in most cases the states showing the largest consumption in relation to last year are those in which there are large Army and Navy training centers and in certain agricultural states. In this connection certain states which, in recent months, have shown increased consumption over the same period last year or small decreases indicating ineffective rationing enforcement are separating their taxable gasoline and that which is exempt from state taxes because it is consumed by the Army and other tax-exempt agencies. Data were presented in Texas, whose gasoline consumption in May was 58.1 per cent greater than in May 1942, showing that all of the 50 per cent increase in June is accounted for by tax-exempt sales.

GASOLINE CONSUMPTION BY DISTRICTS AND STATES FOR MAY 1943

A.P.I. Estimate
(Thousands of gallons)

District—	May 1943	Per cent decline from May 1942
Connecticut	23,167	20.1
Delaware	4,156	17.6
District of Columbia	7,908	40.3
Florida	31,208	13.7
Georgia	28,768	8.4
Maine	8,693	24.7
Maryland	21,068	19.5
Massachusetts	41,409	17.2
New Hampshire	4,475	28.9
New Jersey	53,880	20.2
New York	101,837	26.5
North Carolina	27,573	23.9
Pennsylvania	88,772	27.3
Rhode Island	8,611	7.4
South Carolina	15,646	14.7
Vermont	3,310	30.3
Virginia	30,974	9.6
West Virginia	11,620	31.7
Total District 1	513,075	21.9
District 2—		
Illinois	98,034	27.2
Indiana	57,521	17.6
Iowa	49,775	8.9
Kansas	39,394	11.1
Kentucky	20,578	19.0
Michigan	85,817	15.0
Minnesota	43,088	15.6
Missouri	43,273	26.6
Nebraska	20,042	+2.3
North Dakota	20,414	+19.1
Ohio	106,211	21.4
Oklahoma	30,296	21.4
South Dakota	12,733	13.7
Tennessee	24,669	25.0
Wisconsin	42,375	20.3
Total District 2	694,210	18.1
District 3—		
Alabama	22,150	15.8
Arkansas	14,660	11.5
Louisiana	24,289	6.1
Mississippi	20,692	13.7
New Mexico	7,929	+7.0
Texas	234,749	+58.1
Total District 3	324,469	+30.4
District 4—		
Idaho	8,860	9.2
Montana	10,981	4.5
Utah	8,504	9.9
Wyoming	4,709	11.8
Total District 4	33,054	8.3
District 5—		
Arizona	10,097	9.17
California	184,459	+5.0
Nevada	3,271	19.5
Oregon	22,055	5.5
Washington	36,685	4.6
Total District 5	256,567	+1.8
National total	1,821,375	10.8

September Certifications Establish New Record In Production

WASHINGTON, D. C. — Production of petroleum liquids in September will total 4,552,100 bbl. daily if the recommendation of the Petroleum Administration for War is carried out by the individual states, a new record in national production.

The September recommendation represents an increase of 127,500 bbl. daily over the August certifications. The rates in Districts 1, 2, 4 and 5 are substantially unchanged but the increases in District 3 total 121,900 bbl. daily. Texas will absorb 92,000 bbl. daily of this increase.

Following is the recommended production of petroleum liquids by districts and states:

CERTIFIED PRODUCTION RATES
(Barrels per day)

	September	August
District 1:		
New York	14,700	14,600
Pennsylvania	46,400	46,300
West Virginia	15,200	15,600
Total	76,300	76,500
District 2:		
Illinois	222,800	222,800
Indiana	13,800	14,000
Kansas	300,000	300,000
Kentucky	25,500	25,000
Michigan	60,100	60,100
Nebraska	2,000	2,100
Ohio	10,300	10,000
Oklahoma	347,000	347,000
Total	981,500	981,000
District 3:		
Arkansas	80,100	75,500
Louisiana	375,000	356,300
Mississippi	50,000	50,000
New Mexico	116,600	110,000
Texas	1,909,000	1,817,000
Total	2,530,700	2,408,800
District 4:		
Colorado	6,500	7,000
Montana	23,300	23,300
Wyoming	98,800	98,000
Total	128,600	128,300
District 5:		
California	835,000	830,000
Total U. S.	4,552,100	4,424,600
Total Sept. 1942	4,093,200	

R. B. Kelly Is Named Production Director For District 2

WASHINGTON, D. C.—Raymond B. Kelly, petroleum production engineer for Pure Oil Co. at Clay City, Ill., has been appointed director of production for District 2, by Petroleum Administation for War. His territary embraces Oklahoma, Kansas, Nebraska, Iowa, South Dakota, North Dakota, Minnesota, Wisconsin, Michigan, Ohio, Indiana, Illinois, Missouri, Kentucky and Tennessee.

RAYMOND B. KELLY

Mr. Kelly will take over some of the duties that were filled by Wirt Franklin before Mr. Franklin was sent to Washington as special assistant to Ralph K. Davies, deputy administrator.

Charles C. Brown, assistant director of production, who has been in charge of the work pending the naming of a director, will return to Tulsa and will be in charge of the Tulsa office of PAW.

Mr. Kelly, prior to his association with Pure Oil Co., was with the U. S. Bureau of Mines. In 1925 he joined Pure as division production engineer in Mexia, Tex. When the Van field was opened, Mr. Kelly moved with the division offices to Fort Worth, Tex. In 1932 he was made assistant division manager, and 3 years later was advanced to division manager of the Texas division. Latterly he has been manager of the Illinois-Indiana-Kentucky operations for the company.

District 4 Director May Pass on Spacing Exception

WASHINGTON, D. C.—The director in charge of District 4, M. J. Foley, of the Petroleum Administration for War with headquarters in Denver, Colo., has been delegated authority to pass on applications for exceptions to the well-spacing restrictions of Petroleum Administrative Order 11 for drilling wells in the Cut Bank oil field of Montana. Appeals from his decisions may be made to the PAW in Washington.

Directors Approve Sunray-Superior Merger

Sunray Oil Corp. and Superior Oil Corp., crude-oil producing companies of Tulsa, have entered into an agreement of merger, approved by directors of both companies, under which Superior is to be merged into Sunray. C. H. Wright, president of Sunray, and R. Elmo Thompson, president of Superior, made the announcement of the merger, which has been under consideration for some time.

Basis for the merger agreement is six-tenths of a share of Sunray for each share of Superior. The preferred and common stocks of Sunray will not be changed and the name of the company will continue to be Sunray Oil Corp. The agreement is being submitted to stockholders for adoption.

F. B. Parriott, long a director of Sunray, recently was made chairman of the board of Sunray.

DEATHS

R. E. Burt, 80, oil man and philanthropist, died at his home in Houston, Tex., on August 9, after an illness of more than 6 years. Mr. Burt entered the oil business in 1901 when oil was discovered at Sour Lake, Tex. It was through his efforts that one of the first deep wells in the Gulf Coast area was drilled at Humble.

W. Otto Cozart, 40, oil man of Graham, Tex., was killed when his automobile crashed into a culvert abutment last week. Mr. Cozart had been a resident of Graham for 15 years. His father founded the Gratex refinery.

Lesser Hyman Cohn, retired oil producer of Bradford, Pa., died at Buffalo, N. Y., last week, following a lingering illness of many years.

James McCullough Van Ausdall, 71, of Oil City, Pa., who had worked for National Transit Co. for 35 years before his retirement 2 years ago, died in a Bradford, Pa., hospital, last week following a 2-year illness.

William E. Tanner, 87, a retired employe of Tide Water Oil Co., died last week following a year of ill health. He retired 19 years ago, when he moved from Bradford to Degolia, Pa.

Joseph A. Angove, 77, former assistant general superintendent of National Transit Pump & Machine Co., died in an Oil City, Pa., hospital, last week. He had been in failing health for several months. Mr. Angove was a member of the Oil City council, which service began more than 10 years ago.

T. LeRoy Briggs, 56, for the past 26 years associated with the production department of Gulf Oil Corp., died August 16 at his home in Tulsa, following a heart attack. He had been ill for 6 weeks. Mr. Briggs had lived in Tulsa since 1913.

Industry Vigorously Refutes Charges of Attempting a "Steal"

STRONG protests are being made from the petroleum industry to the statement issued by the Labor Policy Committee of the Office of Price Administration attacking the proposed 35-cent-per-barrel incease in crude-oil price schedules. The labor group in a widely publicized statement said that "America's big oil interests are attempting to put over a billion-and-quarter steal on the consumers of the nation."

The statement of the OPA unit said that the advance in crude-oil prices was not justified based on present earnings of the big companies. The group suggested subsidy arrangements to stimulate the discovery of new oil and to protect the producers of high-cost oil. The arguments against the price increase in these and other respects were similar to those offered in recent weeks by OPA officials.

The statement was believed to be roughly paraphrased from Price Administrator Brown's letter (except probably the allegation of a "steal"), and the fact that it was delivered to newspaper correspondents in franked envelopes bearing the return address of the Office of Price Administration caused some people to believe that OPA had used this indirect method to publicize its views.

The Labor Advisory Committee issued a statement declaring that the committee issued the statement on its own responsibility.

The cause of the secrecy regarding the Brown letter remained a mystery. Administrator Ickes admitted he had received the letter and that he had immediately filed an appeal with Director Fred M. Vinson of the Office of Economic Stabilization in accordance with established procedure. However, he refused to discuss the subject of crude prices any further, or to release the Brown letter or his appeal to the OES.

Col. H. B. Fell, executive vice president of the Independent Petroleum Association of America, termed the statement a "serious charge"

"It appears to be an attempt to smear all those who have had the courage to recommend what is essential to securing an adequate supply of crude petroleum to meet war and essential civilian demand," Colonel Fell said. His statement included a detailed analysis of the conditions on which the 35-cent advance is premised.

Don T. Andrus, president of the Pennsylvania Grade Crude Oil Association, in a statement regarding the charge of the OPA labor group said: "When the people of the nation awake to the fact that there is now and will be an ever-increasing gasoline shortage because of the action of the OPA in refusing to approve a crude-price increase which will not cost the consumer more than 1 cent a gallon compared to a black market holdup of 15 cents a gallon, they will rise up and throw out of power those responsible for that condition."

Federal Order Digest

OPA Regulations

Heating Oil—RO 11, Amendment 74: Extends provisions for renewing heating-oil rations by mail to consumers in the Pacific Northwest (Washington, Oregon and rationed counties of Idaho). Plan is same as already applied in the 30 eastern and midwestern fuel-oil-rationed states, effective August 18.

Asphalt and Asphalt Products—MPR 323, Amendment 6: Establishes new methods by which roofing manufacturers determine ceilings on packaged asphalt. Provides that a producer's maximum price for asphalt is the same regardless of whether he produces it or obtains it from others, effective August 14.

Used Trucks and Commercial Vehicles—RMPR 341: Adjusts ceiling prices for "as is" used trucks and commercial vehicles upward to bring them more nearly in line with values of vehicles in better than average condition, effective August 16.

Maximum Price Regulation 436—All sections dealing with price ceilings for crude oil removed from Schedule 88. Procedure in determining ceilings simplified, effective August 19.

Gasoline Rationing—Value of A, B and C coupons in Districts 2 and 3 reduced from 4 to 3 gal., effective 12:01 a.m. August 16. Order includes other revisions.

WPB Regulations

Antifreeze Chemicals—Amendment to LO L-51: Makes "permanent types" (ethylene glycol types) of antifreeze chemicals available to any person in 12 high-altitude states, pursuit cars used by police cars of the 48 states and by the Department of Justice of the United States, and for any person in Alaska north of Latitude 61. Adds diacetone alcohol to list of materials restricted, effective August 12.

Used Steel Drums — LO L-197, Amendment 1: Restricts use of used steel drums suitable for reuse to packing either edible products or naval stores products, effective August 14.

Seamless Casing — Amendment to Schedule 9, CO L-211: Permitted sizes of seamless casing extended to include 8⅝-in., Grade J-55, 0.264-in. wall, 24-lb. pipe, issued August 14.

Heat Exchangers — GLO L-172, Amendment 1: Provides that purchase orders for heat exchangers authorized prior to July 9 date of issuance of general order are subject to scheduling provisions of order unless otherwise directed, issued August 13.

Safety Equipment—CMPR 5, Direction 11: Establishes method permitting employes to use employers' MRO preference ratings to purchase safety equipment, issued August 13.

Aromatic Petroleum Solvents—Allocation policy for August distribution remains same as for July. Chemicals divisions report numerous consumers still being diverted from coal tar to petroleum xylol.

ODT Regulations

Gasoline Abrogation of GO 39—Releases buses and taxicabs operating in eastern gasoline shortage area from emergency mileage reduction of 20 per cent in effect since May 27.

National Labor Board Decision

Labor Relation—Case R-5678: Directs holding of election within 30 days from August 13 for employes of the Texas Co.'s refinery at Amarillo, Tex., to determine whether they desire to be represented by International Union of Operating Engineers, Local 340, affiliated with A.F.L. for purposes of collective bargaining.

Colombian Output Rise Found to Be Less Abrupt

Because of an error by the reporting agency in converting tons to barrels, crude-oil production in Colombia for June was given as 2,455,720 bbl. in an article by J. P. O'Donnell in the August 12 issue of the Journal. The corrected production total for that month is 1,243,162 bbl., the highest since March 1942, but well below Colombia's peak in February 1942. Total production for the first 6 months this year was 3,561,442 bbl.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Vicious Statement

THE Office of Price Administration, with its stranglehold on petroleum operations through control of prices, last week let one of its hatchet squads loose in an effort to secure consumer support for its makeshift and indefensible position.

Its labor-policy committee, in one of the most inaccurate and unfair statements that has come out of Washington, accused the major oil companies of attempting a 1¼-billion-dollar "steal" in the proposed 35-cent-per-barrel increase in crude-oil prices which is being sought by the industry and PAW.

It is not apparent why OPA, which must accept full responsibility for the statement, was content with a 1¼-billion figure. A 5 or a 10 billion total could have been used and the additional misrepresentation would only have been a matter of degree and more consumers would have been perturbed.

The combined earnings of these so-called "big oil interests" have not totaled a billion dollars over the past 3 years and under the war-tax program none of the suggested changes in the oil-industry price levels would materially change the net-profit position of these companies.

These integrated companies are showing profits in most instances slightly greater than the same period last year. Partially this reflects the Government's restrictions in producing operations and curtailments in the normal maintenance and the expansion of other divisions which means that some of the net earnings are in effect a liquidation of capital assets. Oil shortages are the result.

The net earnings of 15 of these larger units for the first 6 months represented a 6.9 per cent return, a modest yield based on any analysis. For the same period the returns of representative food manufacturers were 12 per cent, chemicals 10.6 per cent and machinery 14.5 per cent with an average for all groups of 8.4 per cent.

A 35-cent advance in crude-oil schedules carried through to consumers' quotations will add a half billion dollars to the gross revenue of the petroleum industry over the next year. This is ½ of 1 per cent of the amount to be spent in the war effort by this country during that period and the success of the entire war program is dependent on oil. The increase would add less than a cent a gallon to consumer costs, amounting to an over-all increase of 7 per cent. Petroleum would continue to be cheapest of all major commodities by a wide margin.

Little of that half billion dollars would go into additional profits. It would aid hundreds of small operators who have not had net profits. Mostly it would be expended to offset greater costs and to pay for increased expenditures in exploratory and drilling operations which are mandatory if a situation in which increased demands are being met from decreasing reserves is to be changed.

Criticism and misrepresentation of the oil business during this emergency period comes in particularly bad taste from a group professing to represent labor. The petroleum industry has led in consideration for employes as revealed in government reports covering income and all the other objectives of labor. These policies predate the war and they will not end with peace

Those representing organized labor in petroleum operations know this and have privately expressed their appreciation. Now is the time for them to speak out in repudiation of those of their number who have become a tool of Washington's opportunists endeavoring to solve every oil problem on a basis of political expediency.

These before-and-after models show what to expect in commercial airliners of the future. That at left is the conventional passenger plane used by most domestic airlines. Behind, modeled to scale, is the commercial version of the C-54 which was about ready for introduction on civilian airlines when war started and it was converted to cargo and troop-transport service for military forces

Postwar-Aviation Demand

by B. H. Weil*

POSTWAR aviation development is currently a topic of considerable discussion, and unfortunately much that is being said is vague and often conflicting. For this reason, it has been considered worth while to survey the literature on this subject in an attempt to arrive at some more quantitative conclusions, especially since the petroleum industry is concerned vitally with the future of the aviation industry, which consumes its quality fuels.

Graham Edgar of the Ethyl Corp., has remarked: "It can be said with assurance that aviation gasoline will be much more important after the war than before, and that 100-octane number aviation gasoline, or better, will be the quality generally employed. No one can predict with certainty the part which aviation will play in postwar transportation, but it will undoubtedly be a far greater part than in the prewar era, and will probably expand into the field of fast-freight movement as well as the mail and passenger field. High power output and fuel economy will be of the utmost importance, and gasoline quality will, therefore, be as important as it is for military purposes."[28]

Newspapers and general (as well as technical) periodicals during these war years have been so filled with glowing descriptions of the future potentialities of air service that only in recent months have there been issued warnings (and then chiefly in technical journals) that aviation in the postwar era will have to be governed by economic laws and not by technologic possibilities. On the basis of the evidence accumulated, and upon technical advances in aircraft design, construction, diversification of type, and propulsion mediums, there appears little doubt that airplanes can be built, or are being constructed, that can carry almost anything to the far corners of the earth—but at a price.

*Information Section, Chemistry Division, Gulf Research & Development Co., Pittsburgh, Pa.

ABSTRACT

Factors affecting the postwar aviation demands for high-octane gasolines are many and conflicting. They include the costs of air-cargo transport, which may approximate 10 cents per ton-mile after the war; air-passenger transportation, which certainly will increase greatly; consideration of the true potentialities of air cargo, such as the transportation of high-cost items and perishables and the reaching of inaccessible places; private flying; degree of continuation of military aviation; and such technologic factors as plane and engine developments, new types of aircraft and facilities.

A survey of the literature has been made to determine as quantitatively as possible the consensus on these and other factors which will have such a profound effect upon future demands for aviation fuels. It can be safely concluded that the postwar period will see demands far in excess of the prewar figure of less than 30,000 bbl. per day, but it likewise seems probable that requirements for the immediate postwar era, at least, will permit the diversion of large quantities of high-octane stocks to automotive fuels.

Costs of Air Transport

Before going into a study of technologic developments and potential economic uses of postwar aircraft, it would be well to summarize the conflicting estimates as to what air transport will cost. Hanson[9] states that "the present cost by air is about 40 cents per ton-mile, and allowing for cheaper and larger transport planes, the immediate postwar cost is expected to drop to perhaps 10 cents per ton-mile; yet this is well in excess of present rail costs, which are measured in mills per ton-mile."

Elaborating on this subject, Pogue[14] has said: "Rail express rates have been estimated at from 11 to 18 cents a ton-mile. Freight rates for railroads range from commodity rates of less than 1 cent a ton-mile for carload shipments to about 7 or 8 cents for first-class less-than-carload shipments. Freight is carried by trucks at a rate of 3 or 4 cents a ton-mile. The cost of ocean shipping is considerably less than that of carload freight. The present indications are that the planes most immediately available in the postwar world for cargo carriage will operate at a total ton-mile cost of not less than 15 or 20 cents; some say 10 cents. . . . Present air-cargo rates (express) are between 80 and 90 cents a ton-mile, several times rail express rates."

W. A. Patterson, president of United Airlines, has said: "The combined effect of all the presently contemplated engineering advances plus a hundredfold increase in volume might be expected to reduce over-all ton-mile costs from their present average of around 40 cents to levels somewhere in the neighborhood of 10 cents per ton-mile, still many times the cost of surface transportation which measures its ton-mile costs in mills."[28] Other sources,[6,7] agree in general with these figures: with the premise that such planes as the Curtiss-Wright "Commando" could carry commercial cargo on long hauls at 12.7 cents per

ton-mile, and that a postwar cargo cost in the vicinity of 10 cents per ton-mile is a distinct possibility.

Comparative Economic Data

It would now seem timely to survey some of the figures upon which these cost estimates are based—figures which uniformly seem to dispel rash optimism as to future prospects. Table 1 is reported to have been prepared by the U. S. Army Service of Supply.[12]

The Standard Oil Co. (New Jersey) has also released some revealing figures on the subject,[2] based upon cargo plane plans and fuel consumption figures (Table 2). Standard mentioned, incidentally, that, for all cargo planes except those of the large Mars type, the weight of fuel which must be carried even on trips involving an ideal number of refueling points exceeds the weight of cargo which may be carried.

Some further figures on this subject have been summarized by Mr. Patterson who, as president of United Airlines, certainly cannot be accused of being prejudiced in favor of rail and steamship transportation. These figures, based on a speech presented before the National Industrial Conference Board at New York, are given in Table 3.[13]

Both methods of transportation have accomplished the same average ton-miles per day. But in addition about 15,000,000 gal. of gasoline would have to be transported by tanker for refueling stations, so that actually 144 planes and 3 tankers are required to do the work of one freighter in the same time interval at 250 times the cost. As mentioned, however, Mr. Patterson believes that air costs can be lowered to the neighborhood of 10 cents per ton-mile.[13]

Based upon somewhat similar premises for hauling freight a similar average number of ton-miles per day between Chicago and San Francisco, Mr. Patterson calculates that it would require 57 airplanes of 2¼ ton pay load to carry the freight which could be hauled in the same period of time by one freight train of 50 cars, 30 of them loaded with 26 tons of freight each, and 20 of them empty. Train costs would total $50,000; the total operating costs of the airplanes would be $1,750,000, or 35 times as much. On a ton-mile basis these figures come out $0.0018 and $0.063, respectively, a surprisingly low figure for air transport despite the unfavorable comparison.

Passenger Transportation

Hansen has said:[9] "Turning to the passenger field, however, a vastly different situation obtains. Here there is no distinction comparable to the difference in freight cargoes. In the passenger field, the chief consideration is the individual's travel objectives, together with relative costs. Fear of accident, formerly a potent consideration, has largely been dissipated by the airlines' splendid safety record of the past 5 years. The

TABLE 1*

Shipment by Water Transport

Route—U. S. to:	Cargo tons per month	Water route, miles (statute)	No. of cargo vessels (C-1)	Fuel, tons required per month	Crew personnel required
Australia	100,000	7,575	54	16,640	3,780
United Kingdom	100,000	3,610	34	7,930	2,380
Alaska	100,000	1,415	16	3,110	1,120
Suez	100,000	14,100	96	30,950	6,710

Shipment by Air Transport

Route—U. S. to:	Air route miles (statute)	No. of cargo planes (C-36A)	Fuel, tons required per month	Crew personnel required	No. of tankers required to supply fuel	No. ships required to maintain personnel plan
Australia	7,565	6,550	1,012,000	78,500	228	69
United Kingdom	3,878	1,900	295,500	22,500	52	20
Alaska	1,565	563	105,500	4,150	9	2
Suez	10,016	5,285	837,300	58,370	85	59

*The Oil and Gas Journal 41, No. 43, 22 (Mar. 4, 1943).

TABLE 2*

What Cargo Planes Mean in Terms of Fuel, Tankers and Steel

	Number of cargo ships estimated in service			100-octane requirement for cargo ships alone (bbl. per day)		
Type of plane—	Jan. 1943	Jan. 1944	Nov. 1944	Jan. 1943	Jan. 1944	Nov. 1944
Light	2,500	12,000	12,000	62,000	298,000	298,000
Medium	1,000	6,000	6,000	49,500	297,000	297,000
Heavy	....	....	1,000	.....	.....	66,000
Total	3,500	18,000	19,000	111,000	595,000	661,000

	Tankers required for transporting fuel			Cumulative steel requirements for aircraft, fuel, tankers (tons)		
Type of plane—	Jan. 1943	Jan. 1944	Nov. 1944	Jan. 1943	Jan. 1944	Nov. 1944
Light	13.8	66.0	66.0	249,000	1,194,000	1,194,000
Medium	11.3	67.8	67.8	190,000	1,143,000	1,143,000
Heavy	....	...	16.4	.....	.....	257,000
Total	25.1	133.8	150.2	439,000	2,337,000	2,594,000

*The Oil and Gas Journal 41, No. 44, 30 (Mar. 11, 1943).

TABLE 3*

Comparative Figures for Moving a 6,400-Ton Cargo From San Francisco to Brisbane

	By ocean-going freighter	By cargo airplane (4-ton pay load)
Number of transports	1	144
Time required	2 months	2 months
Total ship or plane miles	14,000	21,000,000
Fuel consumed	425,000 gal. fuel oil	18,000,000 gal. gasoline
Value of fuel	$9,000	$2,250,000
Crew	55	3,500
Pay to crew	$15,000	$3,000,000
Total operating costs	$120,000	$29,000,000
Cost per ton-mile	$0.00134	$0.324

*Data from Patterson, W. A.; Aero Digest 41, 128 (Dec. 1942).

The Douglas A-20 light attack bomber, called the Havoc, will find a niche in commercial aviation in postwar development of the airways

TABLE 4‡

A Decade of Air Passenger Transportation, 1932-1941

	Revenue passengers carried (thou.)	Revenue passenger miles flown (mil.)	Passenger revenues (thou.)	Average passenger fare per mile (cents)	Ratio of airlines passengers to Pullman passengers per cent)
1941	3,769	1,370	$50,814	†5.0	†13.59
1940	2,726	1,041	43,669	5.1	12.67
1939	1,717	678	28,300	5.1	7.99
1938	1,177	476	23,382	5.7	5.76
1937	969	407	21,708	5.6	4.44
1936	911	388	17,908	5.7	4.64
1935	663	279	12,712	5.7	3.90
1934	*462	*188	8,906	5.9	*2.73
1933	493	173	8,408	6.1	2.82
1932	474	127	4,901	6.1	1.86

*1934 and preceding years include nonrevenue passenger and mileage data. †Approximate. Sources: Civil Aeronautics Administration and Standard and Poors Industry Surveys. ‡Hansen, W. C., Jr., Barron's 23, 3 (Jan. 4, 1943).

American public has become notably air-minded, and will be infinitely more so after the war.

"The growth of air travel has coincided with the downward trend in passenger rates, as the accompanying Table 4 shows."

On distant runs, it is already cheaper to travel by air than by Pullman, considering also that air passage includes meals and accommodations, whereas rail fares do not. Moreover, the saving in time is, of course, a tremendous consideration, especially for commercial travelers.

"Already a definite competitor with quality-type rail facilities, the airplane will begin to draw away traffic from cheaper modes of transportation as plane fares are progressively reduced. Therein lie the great potentialities of commercial aviation. Day-coach fares are now about 1.7 cents per passenger mile, bus rates are approximately 1.5 cents and private auto travel still less, although difficult to compute precisely and to standarize.

"When per-mile costs begin to approach those of bus and auto travel (they are now much higher—see Table 4), the shift to air traffic will be tremendous, although it will be but a partial shift. With Europe but a few hours away, and other remote points within easy reach, the business executive and salesman will be able to multiply contacts and opportunities on a scale not heretofore imagined. For sport and relaxation, Florida, the Rockies and other vacation spots will be brought into almost immediate reach. Not only will scheduled air-line traffic boom but also 'taxi' service and private-plane operation will come into their own.

"But, recalling that the airplane's chief selling points are speed and the conquest of space, its natural function in the passenger market will be for more distant runs. In this respect, it will compete far more directly with train and long-distance bus traffic and with the automobile. For more localized travel, surface carriage will remain the logical preference, and it must be remembered that most commutation, pleasure trips and much bus travel fall within a 100-mile range.'"

Pogue[4] has stated: "In 1940 the railroads carried 181 passenger-miles and 2,835 ton-miles of freight per capita. In a recent 12-month period, the airlines carried 11 passenger-miles per capita but only 65/1,000 of a ton-mile of air cargo per capita." Patterson[13] continues: "As I see it, air transportation is going to revolutionize practically every social and economic viewpoint and practice. In the field of passenger travel, the airplane may well take over a major share of the volume. Passengers as a commodity have a high value per pound and per hour and require a relatively large amount of cubic space. These factors combine to make the costs of transporting passengers by surface means and air somewhat more comparable than is the case with other cargoes. Individuals are also influenced by consideration of convenience, comfort and such intangibles as the romance and prestige associated with travel by air. But an inanimate piece of cargo presents a different problem. Here values per pound bear a much lower relationship to transportation costs. The time saved must be business time, and it must be strictly worth the saving, and weight can be concentrated in a much smaller space."

Economic Potentialities of Air Cargo

Where, then, in the cargo field will the potentialities of air cargo prove economic? It has already been stated that if rates approximate 10 cents per ton-mile they should prove competitive with rail-express rates (11 to 18 cents a ton-mile) and first-class less-than-carload railroad shipments (7 or 8 cents a ton-mile). "One of the largest railroads of the country has a staff report on air cargo in which it is stated: 'Adding up these figures of potential high-grade freight tonnage, the total volume of merchandise suitable for air-cargo freight movement which has not yet been tapped runs to 20,931,000 tons yearly. Of course, a substantial amount of this tonnage might never be diverted to air movement; nevertheless, the potential extent to which air competition can invade this mass tonnage of higher grade traffic should not be minimized.' The report ends with the statement that but one conclusion can be drawn: 'Transportation of freight by air is on the way and will forcibly establish itself during the postwar era.'"[14]

Pan American Airways gives the following example of the utility of air transport for high-value freight: "A manufacturer of hosiery wants to send 50 lb. of his products, valued at $500, from New York to Barranquilla, Colombia. By ship, the cost would run $49.75, including present high war-risk insurance. If the war-risk insurance is deducted the ocean shipping cost comes down to $23.25. By air express (based on today's rates of 80 cents per ton-mile) the same shipment would cost $38.30, with delivery in 2½ days. By ship it would take 10 to 20 days.'"

"The time factor, which is on the air lines' side, plays an important role in business, traffic statisticians point out. Quicker delivery means that smaller inventories are needed, less capital is required, interest charges are saved, depreciation charges are reduced and there is a minimum of obsolescene. . . . News reels, baby chicks, new securities, prospectuses, cut flowers, magazines, newspapers are among the items mentioned by the air lines as their most frequent types of cargo. All are highly perishable and relatively light.'"

In regard to heavier cargo, too, the time factor may be important. RCA is said to be making a study to determine how much it could use air cargo in distribution of its products. Pan American statisticians have figured out for one of the large business machine companies how money could be saved—even at present air cargo rates—on shipments of parts from Dayton, Ohio, to Lima, Peru. Automobile parts constitute a potential market, as substantial inventory reductions could be effected. Women's clothes, with their style perishability, are another item for international trade savings. The same authority' points out, however, that "some materials which form the largest part of surface cargoes clearly will not move by air (except to inaccessible points lacking surface transportation, as in some parts of Latin American). Even at 10 cents a ton-mile it would cost $250 to bring a ton of bauxite from British Guiana to New York, a figure which would make the aluminum in the ore cost 50 cents a pound for transport alone. Finished aluminum now sells for only 15 cents a pound."

New market development will remain a potent factor in postwar air-

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craft-cargo expansion. Inaccessible places in New Guinea, Canada, Alaska, Central America, and numerous other localities have been supplied chiefly by air for some time, making commercial exploitation of these places possible. Other places, as in Africa, will need such service after the war. The airplane has "unique mobility" and "utter disregard of topography." "Air cargo will create other new articles of commerce. Perishables that never before could find a distant market even in a refrigerator car will flow along the air-trade routes of the nation and the world. Others, full-ripened and full-flavored, will come to tables. The speed of the airplane, flying Great Circle courses and shrinking the world in size to a matter of hours, will enable this country for the first time to show with competitive promptness the merits of our products in the remote markets of the world. Gage the commercial value of a Europe 12 hours away instead of a week. Describe the markets of an Orient a scant 100 hours away by air, instead of 50 days away by surface transportation. Our whole economy will be quickened by these new forces. There will some day be billions of ton-miles developed by air cargo and air cargo alone." [14]

It must be noted, as mentioned, that most of the economic potentialities of air cargo seem to lie in long-haul transport, using large planes. A considerable amount of short-haul air traffic certainly will develop, but smaller planes, with lesser economies, will be needed for this. There is no reason to believe that the train and bus will be displaced completely at any future time, although such items as mail may soon be completely airborne for all but very short hauls.

Private Flying

Private flying seems certain to increase greatly after the war, although a "plane in each garage" may be still a fanciful idea, dependent upon commercial development of a low-cost foolproof version of such a plane as the helicopter, and the maintenance and modification of safeguards, training, and sky rules to prevent the high accident rate which might ensue. What probably will happen in the first few postwar years is an acceleration in the use of simple and reliable small, conventional airplanes, developments of those which sold for about $1,300 before the war and, with mass production, should be available for less than $1,000. Large and expensive airports were not required for this type of airplane, which could operate safely on any comparatively smooth substantial area. It may well be that the public will have the choice of any one of several such airplanes within a few years after the war.

The helicopter type of aircraft is an unpredictable factor, discussed more fully under "technologic factors." Its influence on the future of private flying may be profound.

The interest in and acquaintance with aircraft developed by the present war in thousands of soldiers and sailors certainly should carry over into the postwar period. It is believed in some quarters, incidentally, that private civilian aircraft will use the general prevailing grade of gasoline rather than special aviation gasoline.

Military Aviation

According to a recent article:[6] "It can be accepted as fact that the airplane (chiefly the giant bomber) has become the most important single instrument of foreign and domestic security policy. It can also be stated, with somewhat less assurance, that the United States will not again lapse into unpreparedness as we did so optimistically after the last war.

"On this basis, well-informed guesses place the yearly needs of the Army and Navy at not less than 25,000 planes, possibly much more.

"Here's how it's figured. The minimum needs for a basic bomber force would run about 25,000 planes; the necessary complement of trainer and fighter planes would be at least 100,000. And to keep this force fully up-to-date, the entire number would have to be renewed every 5 years. This reasoning leads to an estimate of 25,000 military planes produced annually—5,000 bombers and 20,000 smaller craft.

"Of course, any major postwar advances in plane design or a substantial contribution to an international police force would, in either case, force an upward revision in these figures."

In any case, it appears certain that military demands for aviation fuels will remain a potent market factor in the immediate postwar years. Certain types of ground vehicles may continue to require aviation fuels for their operation, and total military and associated demands certainly should far exceed the prewar figure of less than 30,000 bbl. daily.

Technologic Factors

Under this heading may be grouped plane and engine developments, new types of aircraft such as the helicopter, glider developments, and terminal facilities. A detailed discussion of these factors, while distinctly pertinent, cannot be included here.

Under plane developments logically falls the subject of converting wartime crafts to peacetime cargo purposes. Table 2 has indicated that the termination of the war will find the United States in possession of thousands of cargo planes, in addition to the tens of thousands of bombers whose economic conversion to cargo carrying seems questionable to some.[16] If these planes are made available, and if manufacturers turn out many like them before converting to peacetime items such as automobiles, newer technologic developments, with their ensuing economic possibilities, may be postponed several years.

Woodhead[17] has said: "Conversion (of military to cargo planes) after the war will be strictly a compromise measure—a stopgap. . . . We will never return to the custom building of aircraft. . . . We can use the conveyor line to make lots of 50 more economically than if we went back to prewar methods. . . . Big as our designs are now, we have not in any of our contemplated designs reached a limit on size. . . . The question is not how large we can make planes, but what is the most economical size. . . . Steel will be used more and more as aircraft increases in size and weight." Plastics and plastic-bonded plywoods will also play their parts. It has been pointed out, incidentally, that cargo planes probably will require more than one set of motors before the fuselage is worn out.

In regard to engine developments, direct injection systems have been mentioned as future developments, although such systems are reported by some quarters to be expensive and somewhat insusceptible to design modifications. Quantity or quality-fuel requirements probably would not be affected greatly, even should they be used widely. As regards the potential use of diesel engines, opinion is divided.[18] Some quarters believe that the current type of spark-ignition engines will continue to give better fuel economy than will say any light diesel engine which may be developed. Other sources predict wide future use of diesels in large cargo and passenger aircraft. Jet propulsion and rockets are also being experimented with.

As regards the helicopter and autogyro, opinion is again divided, some sources believing that the inherent advantages of vertical ascent and descent, slow landing speeds, and simple controls will be outweighed by expensive maintenance and certain technical factors. Other sources are not so pessimistic. According to one authority,[3] the postwar economics of the helicopter seem favorable to commercial use. Gasoline mileages of 6-8 miles per gallon and speeds up to 140 miles per hour are said to be possible, and it is stated that, with quantity production, "engine costs should come down so that the machine may be within the pocketbook range of a large percentage of the populace."

Cargo gliders are becoming increasingly important for military transport and have potentialities for short-range freight-carrying operations, according to another writer.[4] Utility for hauls up to a thousand miles is predicted. Other authorities, pointing to landing hazards, doubt any application to passenger hauling and believe that at least the immediate future of gliders

is limited.

In regard to terminal facilities, Pogue[14] says: "Technologic considerations and the operating costs of the planes to be used in air cargo are the central problems of its development. They are by no means the only ones. Ground handling, pickup and delivery, has often been called the 'Achilles heel' of air cargo, Provision will have to be made for air-cargo terminal facilities. The airport problem should not be overlooked. Prior to the war there were only approximately 200 airports in the United States suited to use by the most modern types of aircraft. At some of them, traffic congestion was in the offing. Additional airway facilities and, as they become available, new types of such facilities, will be needed.

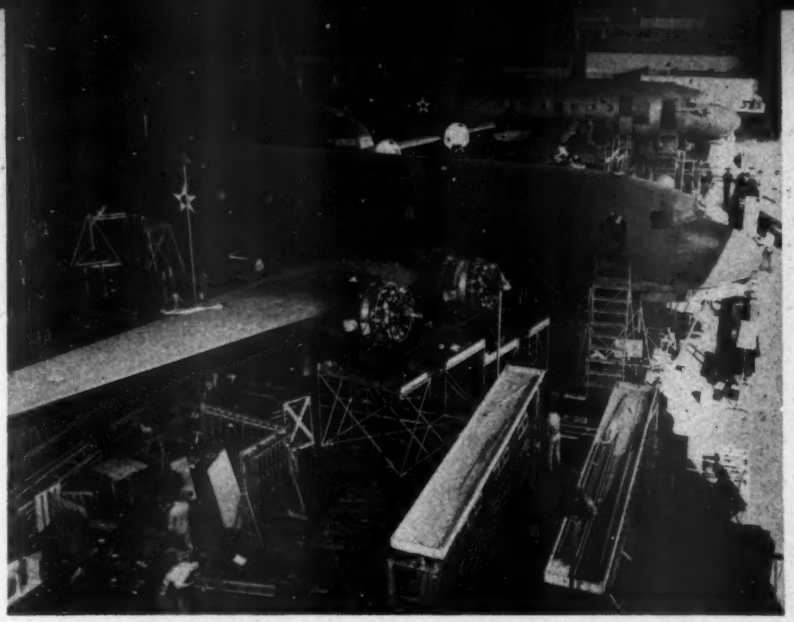
"In approaching the solution of these ground problems, points of view must be kept fresh. Landing fields at expensive airports, sometimes far removed from the center of the city, may become outmoded. Landing strips at factory sides may be built and may, to a large extent, take the place of airports in cargo operations. It cannot be predicted now what the new orders of the air age will be."

Conclusions

This article has been entitled "Postwar Aviation Demands for High-Octane Gasolines" but has been devoted primarily to factors affecting these demands, for the reason that hard-and-fact figures cannot be estimated with any degree of precision. To quote from a recent memorandum:[16]

"Provided financial fingers are not too scorched by losses from over-optimistic air-transport expansion in the immediate postwar period, the overall situation is not too dark. Jet-propulsion, diesel engines, and the use of types of engines other than those now in use may be future possibilities or probabilities, but they will not affect the immediate postwar future. Passenger service will continue to 'take to the air,' and it is here, rather than in freight-carrying, that the airplane eventually may supplant the train, bus, and ship. Perishables, high-cost staples, and items demanding speed of delivery first and considering cost of transportation second will all be carried in increasing tonnages. Better airports with quicker services will have to be developed—nearer the hearts of cities. Octane requirements may decrease somewhat for certain types of services but not in the immediate postwar period. Transoceanic service will increase quickly and, to an extent, permanently.

"It seems to me that the first year or two after the war have about a 50-50 chance of seeing demand not too far below wartime levels. Military purchases, as a guess, may drop 50-75 per cent, but not all at once, and frantic get-rich-quick experiments may take up much of the slack. I do believe that demand will continue to fall for a period after this, but total demand always will greatly exceed prewar levels."



These air Leviathans C-54's are in mass production for military purposes and will be, Douglas Aircraft Co. engineers believe, one of the most readily adaptable of military planes to commercial purposes after the war. Their four engines consume about 150 gal of fuel per hour

Aviation gasoline output will approximate 300,000 bbl. daily by the end of this year, it is believed, and will go on to higher goals in 1944 and 1945, if the war continues. But certain aviation gasoline components "such as cumene, now being used to give specific military advantages such as 'lift,' seem likely to prove too expensive for wide postwar use, especially since their miles-per-gallon output is lower than for agents such as the isooctanes. Many emergency projects, especially certain converted equipment and small-scale plants, immediately will prove uneconomic when the need for every possible gallon of aviation gasoline no longer exists." [16]

Among the factors not considered in this article is that of international aviation regulations. Freedom of the air is not assured, and for that very reason it cannot be discussed with any degree of certainty. A point worthy of attention as regards international-air transport, incidentally, is that, if aviation gasoline eventually is produced at many points throughout the world, the situation as regards tankers and costs of transporting aviation fuel to the far corners of the earth will be brightened considerably. On the other hand, disallowing the factor of production of aviation fuels in foreign countries by American interests, this picture is not at all promising as regards outlets for American-made aviation gasoline, the primary interest of the American petroleum industry.

It can be concluded only that there will be a greatly increased market for aviation gasoline over prewar levels, and it seems safe to say that large quantities of high-octane stocks can be made available for automotive purposes for at least the first few years after the war. Only the future holds the complete answer.

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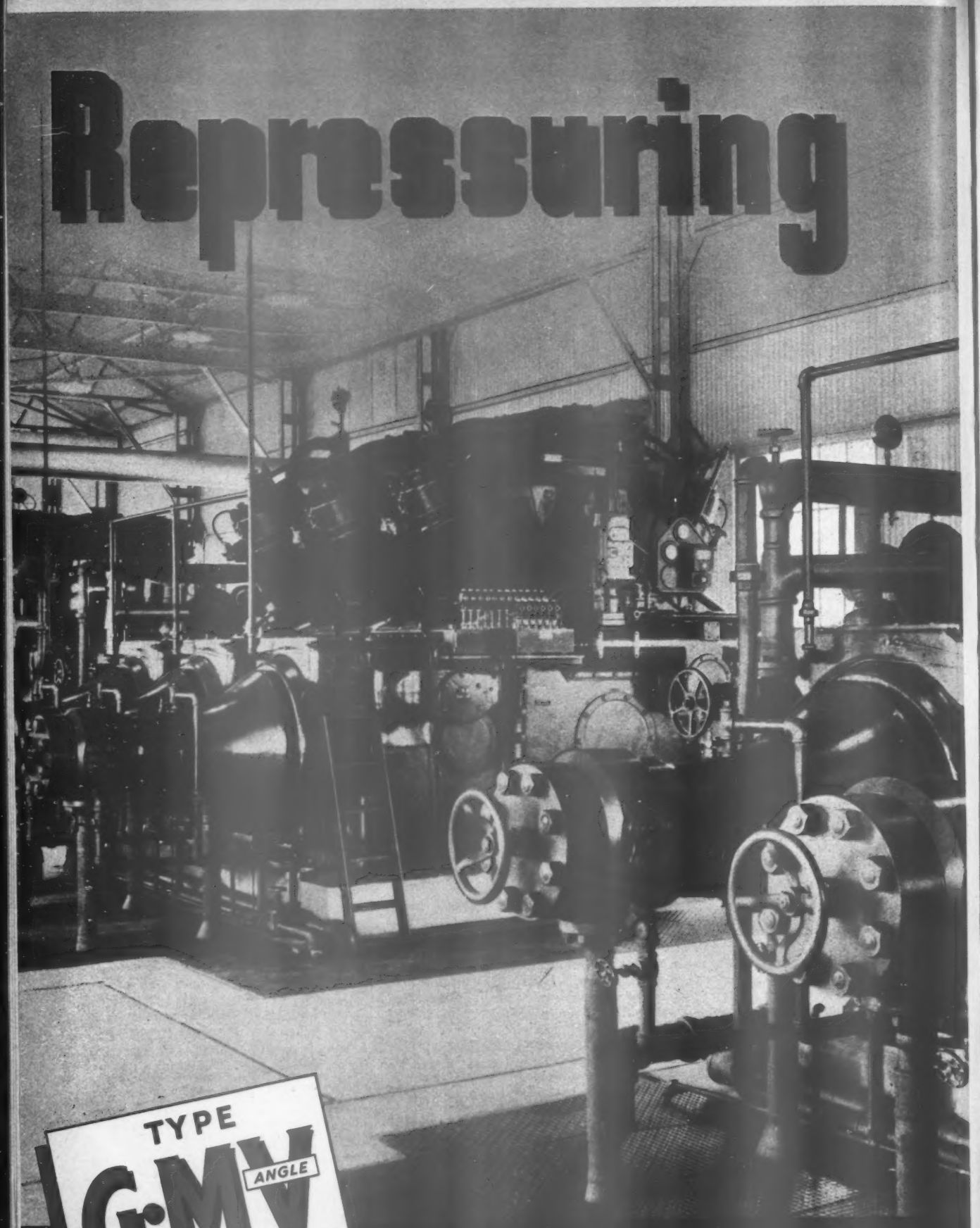

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Benefits of Slow Pumping Rates

by Neil Williams

Production records by various western Kansas operators indicate that the rate of water increase in most wells can be reduced appreciably and ultimate recoveries can be boosted by producing the wells at relatively slow rates of fluid withdrawal. Some aspects of the studies that have been made of water production at high and slow fluid withdrawal rates are discussed here.

MOST problems pertaining to the production of oil in western Kansas fields are directly attributable to the relatively large volumes of water that often must be handled. Producing formations in these fields, principally the Arbuckle lime, generally carry considerable water. The Arbuckle lime, source of the major part of the oil production, in particular has an unusually active water drive with the water in close association with the oil in the reservoir. Ordinarily, in this horizon, water shows up early in the life of a well and then increases rapidly in rate of output. This not only creates problems in disposal and increases net oil lifting costs, but also, since the water is highly corrosive, adds to the difficulties in protecting and maintaining equipment.

For these reasons, added importance is attached to the adoption of production measures designed to retard the encroachment of water and minimize the amount of water that must be handled. Chief among these measures are those that concern the production of wells at reduced rates of fluid withdrawal. This calls for operation of wells, whenever possible, at slower pumping speeds and with shorter strokes, and thus obtaining production allowables over longer periods of time than otherwise would be required. In most cases where this practice has been followed, it has been indicated that not only is the rate of water increase in a well not so great as with the higher rates of fluid withdrawal but also the ultimate oil recovery will be substantially increased.

Production practices in western Kansas until recent years generally were characterized by comparatively high rates of fluid withdrawals. Under those practices most wells were completed with large-sized tubing and pumps and heavy-duty pumping equipment with a view toward handling large volumes of fluid. This was induced to a great extent by the procedure which then existed of basing allowables on physical potential tests, in which wells were pumped at capacity over 24-hour periods. With the large-sized equipment operated at high speeds and long pumping strokes, greater fluid capacity could be shown, and, in turn, higher allowables obtained. This drew water in rapidly, accentuating natural encroachment, and as the rate of water intrusion increased, it followed that increasingly large volumes of fluid had to be lifted to maintain oil allowables.

General adoption of the drawdown method of determining well productivity has been an important factor in retarding water encroachment. This method, involving calculations based on fluid levels at various low rates of production, eliminates occasion for pumping wells at capacity during tests, and so forestalls pulling a lot of water into the wells at those times. It also has made possible the use of much smaller pumping equipment, tubing and pumps in completion of wells, which has been an incentive toward lifting smaller volumes of fluid during regular pumping operations. However, with water increases in wells, many operators continue to resort to relatively high rates of fluid withdrawals to recover the oil with the result that the rate of water increase in turn mounts rapidly.

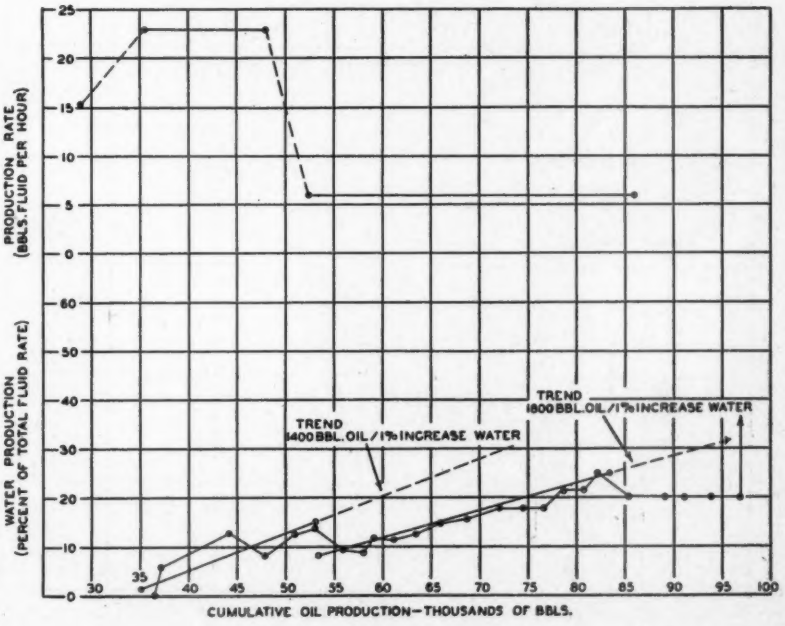
PRODUCTION RATE (BBLS. FLUID PER HOUR)
WATER PRODUCTION (PERCENT OF TOTAL FLUID RATE)
TREND 1400 BBL. OIL / 1% INCREASE WATER
TREND 1800 BBL. OIL / 1% INCREASE WATER
CUMULATIVE OIL PRODUCTION—THOUSANDS OF BBLS.

Fig. 1

The effect of fluid withdrawal rates upon the rate of water increase and ultimate recovery of oil are reflected in the accompanying charts which are based upon the production records of a small lease in a western Kansas field in which production allowables were increased substantially during a 2-month period, and then because of the water increase, were reduced. The lease had six wells which had been on production from a year to 1½ years prior to the time of the special boost in allowables. Production of the lease had varied from 4,400 to 7,200 bbl. per month, averaging about 5,700 bbl. with a production rate of 6 to 7 bbl. per hour.

During the first of the additional allowable, production of the lease was increased to 32,037 bbl., averaging 47 to 48 bbl. per hour. For this fluid withdrawal rates were boosted from 10 to 15 bbl. to 20 to 25 bbl. per hour per well. This resulted in a rapid increase in water in wells that had made little or no water, for the extra allowable wells were speeded up with faster and longer strokes and some wells were pumped almost continuously. During the latter part of the second month, withdrawal rates were reduced appreciably, due to the water increase, and production for the month totaled 16,162 bbl., averaging 21 to 22 bbl. per hour for the period pumped. This was accompanied with a decided drop in water production rate.

After the second month, fluid withdrawal rates were reduced to 6 to 8 bbl. per hour per day with total oil production averaging approximately 9,000 bbl. per month. With this there was an additional decline in water output rate for a time, and when the water again started to increase it was at a much slower rate per barrel of oil than during the period when the fluid withdrawal rate was high.

The oil recovery in respect to the increase in water production for the various wells on the lease during the 2-month period of high withdrawal rates as compared with that during the subsequent period of reduced withdrawal rates is shown in Table 1.

TABLE 1
Barrels of Oil Recovered Per 1 Per Cent Increase in Water Production

Well—	Withdrawal rate 20-25 bbl. per hour	Withdrawal rate 6-8 bbl. per hour
1	1,400	1,800
2	450	1,400
3	250	400
4	30	300
5	450	650
6	No change	

Estimates of the ultimate oil recovery of the wells listed in Table 1 that could be expected at the higher rate of fluid withdrawal as compared with the ultimate recovery anticipated at the lower rates of withdrawal are given in Table 2.

TABLE 2
Estimated Ultimate Recovery

Well No.	Fluid withdrawal rate 20-25 bbl. per hour	Fluid withdrawal rate 6-8 bbl. per hour
1	187,000	213,000
2	71,500	138,000
3	49,700	53,000
4	16,800	39,000
5	65,000	77,500
Total	390,000	521,300

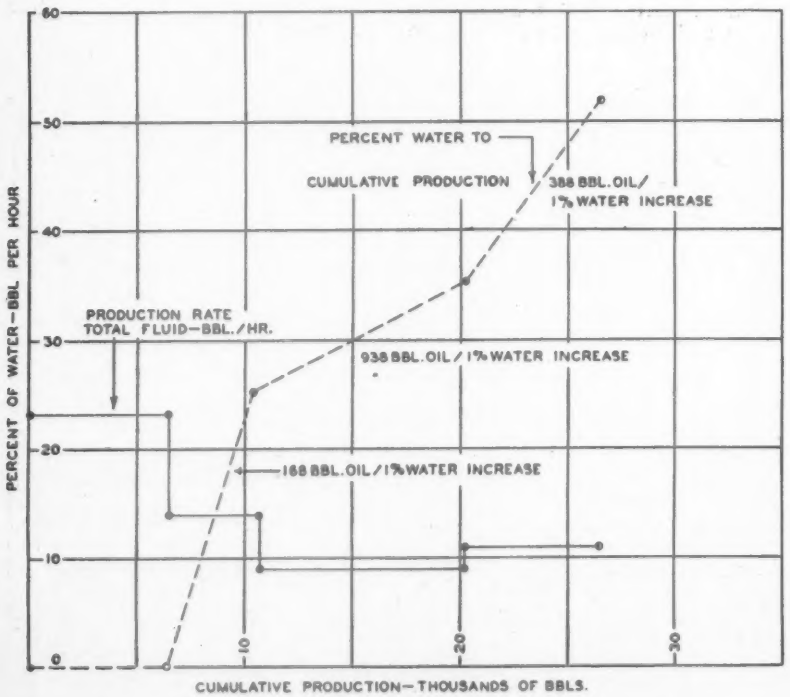

Fig. 2

These estimates indicate that an additional 131,300 bbl. of oil can be expected to be recovered from the lease as a whole if the rate of fluid withdrawal is maintained at the low level. The estimates are based on the trends in oil recovery in respect to the rate of water increase as listed in Table 1. The trends in oil recovery at the high and low rates of fluid withdrawal as they relate to well No. 1 are shown in Fig. 1. The top curve in this chart reflects the changes in fluid withdrawal rates which were increased from approximately 15 bbl. per hour to between 20 and 25 bbl. per hour for 2 months and then reduced to from 6 to 8 bbl. per hour, which rate has been maintained. The irregular line of the lower curves shows the percentage of water produced with the oil at these respective rates of fluid withdrawal. Here the percentage increased sharply during the period of high fluid withdrawal rates, and then declined when the fluid withdrawal rate was cut back to between 6 and 8 bbl. per hour. After this, although the water percentage did not continue at its reduced level, the later increase was a much slower rate. The straight lines reflect the trends in water production for 1,400 bbl. of oil recovery increase and for 1,800 bbl. of oil recovery per 1 per cent water increase, as listed in Table 1. The dashed portions of the lines are extrapolations of the trends during the actual producing periods.

Increased Recoveries

In Fig. 1, the water percentage points on the curve from 55,000 to 85,000 bbl. of oil are in a straight line. It was during this period that the fluid withdrawal rate was held constantly at from 6 to 8 bbl. per hour. If the withdrawal rate is maintained at the same rate, it is believed the line will continue straight upward to some point between 80 and 90 per cent water. Then it would slope continuously so that more than 1,800 bbl. of oil would be recovered for each 1 per cent increase in water. Because this new slope cannot be estimated closely, the ultimate production cannot be estimated exactly from the existing slope of the trend line. However, it is believed some maximum and minimum estimates can be made. To the 85 per cent water point, at the slope of 1,400 bbl. per 1 per cent water increase, 151,000 bbl. of oil would be produced, but at the slope of 1,800 bbl. of oil per 1 per cent water increase, 192,000 bbl. of oil would be produced. Then, as a minimum amount recovered up to 97 per cent water at the slower withdrawal rate, assuming the same slope of the 1,800-bbl. line, the result is an additional 21,000 bbl. of oil for a total of 213,000 bbl. ultimate recovery. For a maximum at the higher rate of withdrawal,

(Continued on Page 65)

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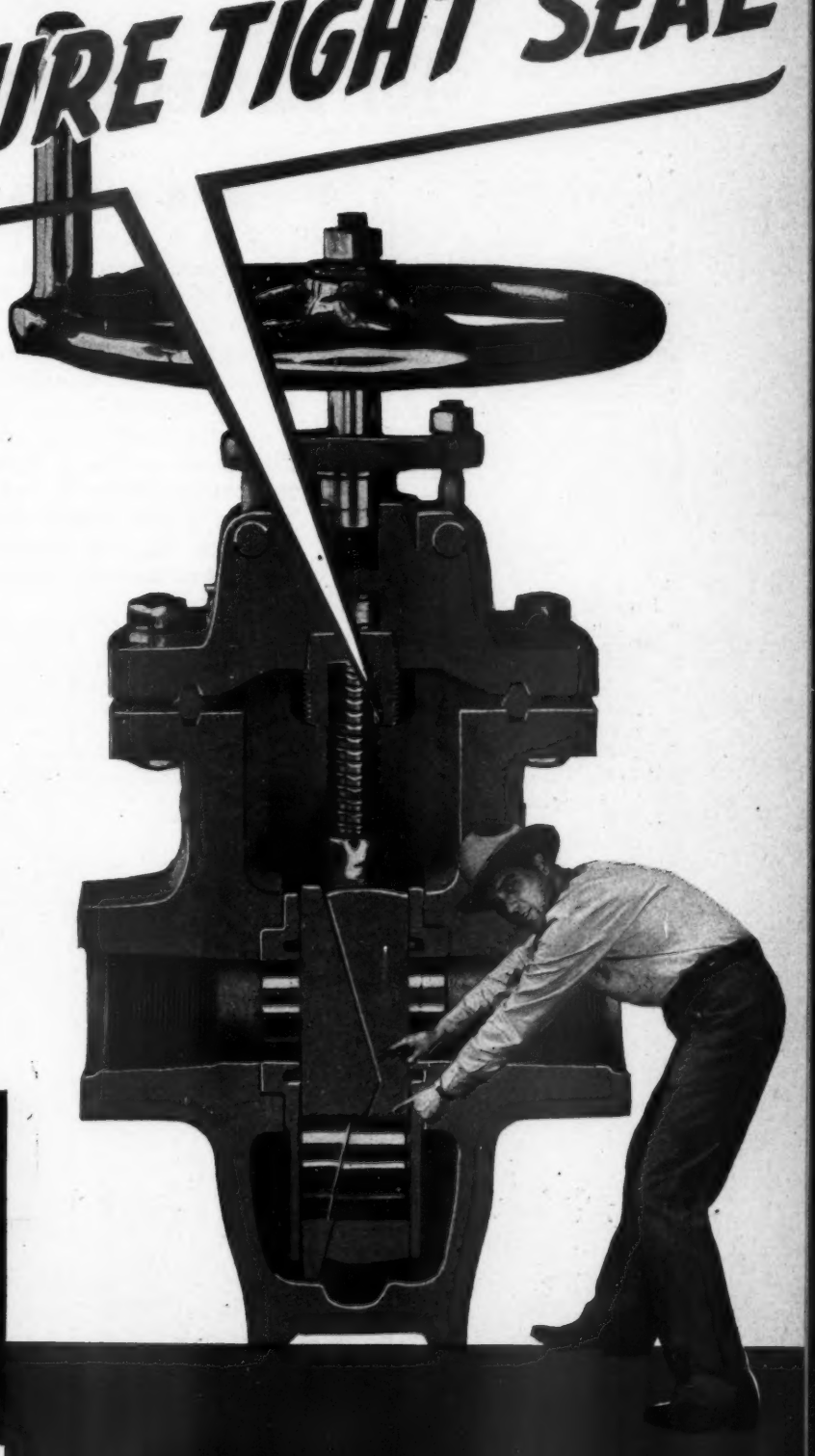

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Reforming Refinery Still Gases For Market Consumption

*by R. L. Bevan**

The conversion of the heat value of cracking still gas to make the use of this fuel interchangeable with that of natural gas when supplies of the latter are insufficient to meet distribution demands is discussed in this article. An important phase of this processing is the purification of this gas for the removal of hydrogen sulfide content.

THE rapidly expanding war production of Canada made it apparent in 1940 that increased sources of gas would be required in southwestern Ontario to supplement the natural-gas supply. The Union Gas Co. of Canada, Ltd., whose distribution system covers much of this district, in 1941 entered into a contract with Imperial Oil, Ltd., for the purchase of the latter's Sarnia refinery surplus cracking-still gas, which gas properly processed was known by Union Gas Co. to be fully interchangeable with its own natural gas when burned in natural-gas appliances.

The still gas is brought through an 8-in. line to a central point at the southern part of the Sarnia No. 2 plant of Imperial Oil, Ltd., where it is metered and the heating value determined. Then it is piped to Union's reforming plant which is adjacent on the south to Imperial's property.

Burrell-Mase Engineering & Construction Co. was engaged by Union to design under the Faber process gas-reforming patents, suitable plant and equipment to convert the still gas into a form suitable for direct admixture with Union's natural gas then being distributed, or for use without admixture, in Union's natural-gas appliances, as occasion might demand; thereby augmenting the company's gas resources by approximately 2 billion cubic feet per year.

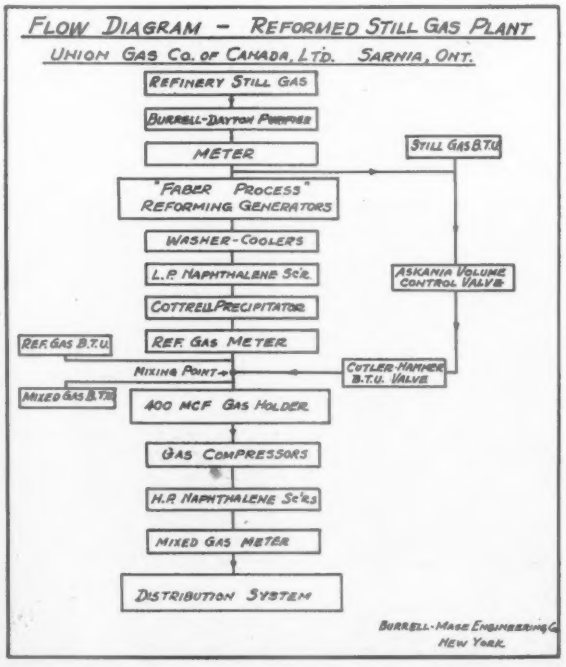
Working under the designs and direction of Burrell-Mase company, the construction work was started by Robertson Construction & Engineering Co., Ltd., of Niagara Falls, Ont., during September 1941 and the entire undertaking completed by October 1, 1942. After some preliminary operating runs and tests, the plant was placed in commercial operation on October 16 and has been in continuous successful production of reformed gas 24 hours per day since then.

The refinery gas as delivered by Imperial Oil, Ltd., varies in volume from 2.6 to 3 million cu. ft. per day during the winter months and 4 to 6 million cu. ft. per day during the summer months (May 1 to November 30). Moreover, the heating value of the still gas varies daily from 1,200 to 1,800 B.t.u. per cu. ft. with an average value of about 1,600 B.t.u. per cu. ft. The still gas as delivered to

*Chief engineer, United Gas Co. of Canada, Ltd.

Scrubbers and precipitators of Union Gas Co. of Canada, Ltd.

Fig. 1—Flow diagram of reformed still gas plant



Union contains hydrogen sulfide of slightly over 200 grains per 100 cu. ft. and this may vary depending upon the source of Imperial's crude-oil supply. This hydrogen sulfide must, of course, be removed from the gas before reforming and delivery to Union's transmission and distribution systems.

The "Faber Process" of reforming gases in use at Sarnia, is generally similar to the Dayton process for the manufacture of oil gas. The basic chemical reactions are the same, the major difference in the two processes being in the form of the raw hydrocarbon materials processed. The equipment at Sarnia is designed for the generation of reformed gas or Dayton oil gas and either process can be carried out interchangeably, if required. The combination of these processes is known as the Dayton-Faber system.

Capacity and Function of the Reforming Plant

The rated capacity of the reforming plant in terms of 1,600 B.t.u. still gas volume is 6,000,000 cu. ft. per day, or 9,300,000 cu. ft. in terms of 1,000 B.t.u. mixed gas per day.

The function of the reforming plant in general, consists of the following steps: (1) To purify the still gas of its sulfur content; (2) to reform the still gas to a uniform heating value, namely, 1,000 B.t.u. per cu. ft. or the same as the natural gas in the Union system; and (3) to compress and deliver the 1,000 B.t.u. reformed gas to line pressure required on the distribution system. (Fig. 1.)

Plant Operation

The still-gas reforming plant consists of the following detailed operations: The raw still gas as received is purified to remove the hydrogen sulfide by means of the Burrell-Dayton lime-slurry process. The raw gas is passed at 50 to 60 lb. pressure through an 8 to 10 per cent solution of milk-of-lime and the sulfur removed by reaction with the lime to form lime sulfide. This treatment purifies the still gas from 200 grains of sulfur down to less than 1 grain per 100 cu. ft. of gas. The equipment is designed to handle a sulfur gas content as high as 1,500 grains per 100 cu. ft. of gas treated.

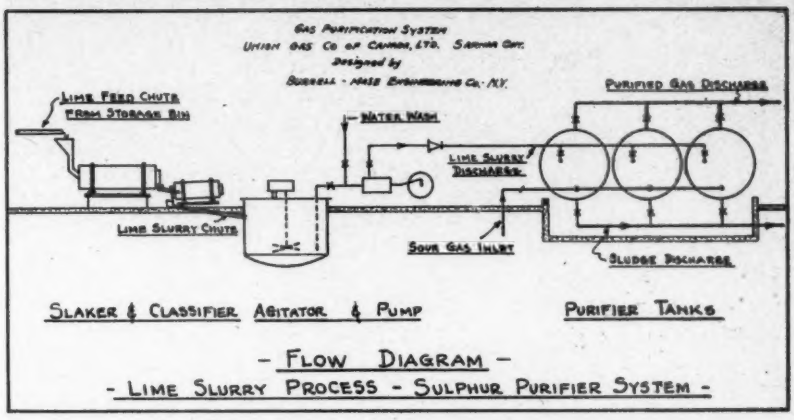
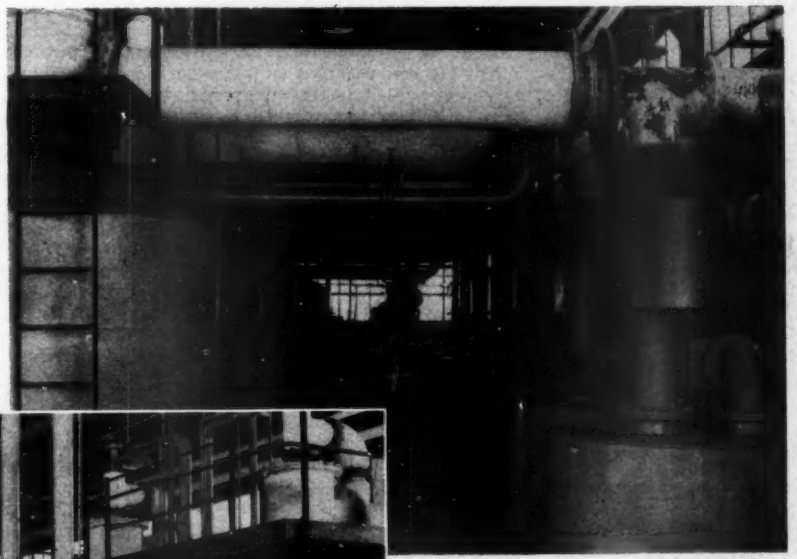


Fig. 2—Flow diagram, lime slurry process—sulfur purifier system

The purified still gas, whose average composition is shown in Table 1, Column 1, passes from the purifiers to the gas-reforming equipment where part of the still-gas volume (approximately one-quarter of the total volume), is reformed in the combustion chambers at low pressure to a 400 B.t.u. gas by the Faber process at a temperature of 1,600° F. The resulting 400 B.t.u. gas (Table 1, Column 2) is then cooled with a direct water spray to room temperature in the washer coolers. The volume of water in these washer coolers must be kept up to approximately 75 gal. per minute and through the use of interchangers should be pumped into the cooler system at 60° F., it being necessary to wash out acids formed during reforming. The cooled reformed gas then passes through an oil scrubber at low pressure, to remove the naphthalene impurity formed in the combustion chamber of the reforming unit. The naphthalene-free reformed gas passes to the Cottrell electrical precipitators for removal of tar and other condensable impurities. The clean reformed gas passing from the precipitators is then mixed with the straight unreformed portion of the still gas to produce a 1,000 B.t.u. mixed gas. The mixed gases flow into the 400,000-cu. ft. stor-



Right: End view of gas reformers and seal pots. Below: Gas reformer units and mixed gas compressors

Lime slurry and classifier and slurry pumps

age holder and are stored temporarily. The mixing of the still gas with the reformed gas is automatically controlled by an Askania volume control and a Cutler-Hammer B.t.u.-control equipment. Recording calorimeters are provided for the still gas, reformed gas, and the mixed gas.

From the storage holder the mixed gas (Table 1, Column 3) flows to the suction header of the Clark Brothers compressor and is compressed to 100 to 175 lb. and delivered through the final high-pressure oil scrubbers for removal of the last traces of naphthalene. The mixed gas is metered at the outlet of these scrubbers and the gas flows into the distribution system to supply western Ontario.

Process Conversion Efficiency

For the production of 1,000 cu. ft. of mixed gas, the process takes 143.5 cu. ft. of 1,600 B.t.u. still gas and reforms this volume to 500 cu. ft. of 400 B.t.u. gas at 83.3 per cent thermal efficiency. To this 500 cu. ft. there is mixed 500 cu. ft. of 1,600 B.t.u. still gas, thus producing 1,000 cu. ft. of 1,000 B.t.u. mixed gas. Therefore, a total of 643.5 cu. ft. of still gas is required per 1,000 cu. ft. of mixed gas. The total over-all thermal conversion efficiency is, therefore, 96.15 per cent.

Items and Description of Plant Equipment

The plant equipment is described in detail in sequence as follows:

(a) Lime-slurry sulfur purification and handling equipment.

(b) Reforming generators and auxiliary equipment.

(c) Oil scrubbers for naphthalene removal.

(d) Cottrell electrical precipitators.

(e) Gas holder.

(f) Steam boilers for heating.

(g) River-water pumps and booster pumps.

(h) Gas-engine compressors.

(a) Burrell-Dayton lime-slurry sulfur-purification equipment.—The purification equipment consists of an 80-ton quick-lime storage bin with elevator for handling lime from carload lots from railroad siding. From the bin the quick lime in size of ¾-in. mesh is fed to the rotary-type slaker. The feeding of the lime is handled by a vibrator which feeds the lime continuously and uniformly as desired. The lime is mixed with water in the slaker at the rate of 400 to 600 lb. of quick lime per hour. The slaked lime, excess water and grit pass from the slaker into a classifier which removes all the grit from solution. The malk-of-lime solution flows from the classifier to the agitator tank of 5,000 gal. capacity, where the milk-of-lime or slurry is stored ready for charging to the purifier tanks as required. The lime slurry is pumped from the agitator tank to the sulfur-purifier tanks as new charges are required. The lime-slurry pumps are 15-hp. electric-driven piston-type pumps, having a capacity each for 270 g.p.m. at 80 lb. pressure. Lime is the only raw material required; no steam is used, and the labor costs are low.

The purifier tanks consists of three 8-ft. diameter by 14-ft. pressure tanks which are connected in series and arranged with special manifold and piping so that any tank may be shut down and cleaned if necessary, while the other tanks are in service. About 700 lb. of quick lime are required per 1,000,000 cu. ft. of 300-grain sulfur gas. When the gas leaving the first tank in the series shows a stain on paper wetted with lead acetate solution, the lime solution is saturated with sulfur; the spent lime slurry is then blown out through the sludge drain to a large lagoon; the purifier tank is then charged with a fresh solution of lime slurry from the agitator tank. (Fig. 2.) The process is continuous in the sense that recharging of any absorber in the series with fresh lime-slurry solution can be effected without taking the absorber off stream.

(b) Reforming generators and auxiliary equipment. — The reforming generators consist of six 1,000,000-cu. ft. per day capacity units, one or more of which are in service at one time depending upon the still-gas volume available from the Imperial refinery. The reforming units are equipped with heat exchangers, seal pots and explosion heads. The auxiliary air blowers for the reforming process consist of three 1,200 cu. ft. per minute single-stage blowers with 3 lb. discharge pressure. These units are V-belt driven, each with 30-hp. electric motors. Three washer-cooler units complete with scrubber grids and multiple spray heads, are supplied for cooling the total capacity of reformed gas generated from six reforming generators.

Located adjacent to the reformer units is an instrument panel complete with recording pyrometers, air-gas ratio controls, flow gages, pressure gages, and Foxboro flow meters for the various gases. The panel is also equipped with Cutler-Hammer recording calorimeter instruments and charts for the B.t.u. values of the still gas, reformed gas, and the mixed gas.

(c) Oil scrubbers for naphthalene removal.—During the reforming process of the still gas, a small quantity of naphthalene is produced. About 40 grains of naphthalene per 100 cu. ft. of reformed gas is present in the gas leaving the washer-coolers. The major portion of this naphthalene is removed in the low-pressure oil scrubber where oil absorbs the naphthalene while in contact with the reformed gas. The balance of naphthalene present is removed in the final high-pressure oil scrubbers located on the discharge line from the gas compressors.

The scrubbing oil is recirculated through each scrubber unit by separate pumps, each at the rate of about 30 g.p.m. Fresh oil is supplied continuously at the rate of about 80 to 90 g.p.m. per 1,000,000 cu. ft. of mixed gas send-out. The newly charged fresh oil gradually works its way through from the No. 1 high-pressure scrubber through No. 2 high-pressure scrubber and thence to the low-pressure scrubber in the reformed-gas line, known as the No. 3 oil scrubber. This flow of oil is regulated by liquid-level float controls.

(d) Cottrell electrical tar precipitators. — The reformed gas leaving the low-pressure oil scrubber passes into precipitators consisting of two units of twenty-four 6-in. diameter tubes, each. The function of these units is to remove suspended free-flowing tar, oil or water particles continuously from the reformed gas. The rated capacity of each unit is 3,000 cu. ft. per minute under conditions of 90° F. and 34 in. of mercury absolute pressure. Both units are normally in service and the tests show that over 95 per cent of the impurities are removed from the reformed gas. All control equipment for the precipitators is located in a special building adjacent to the units. The control equipment consists of voltage regulators, transformers, switchboard, mechanical rectifiers,

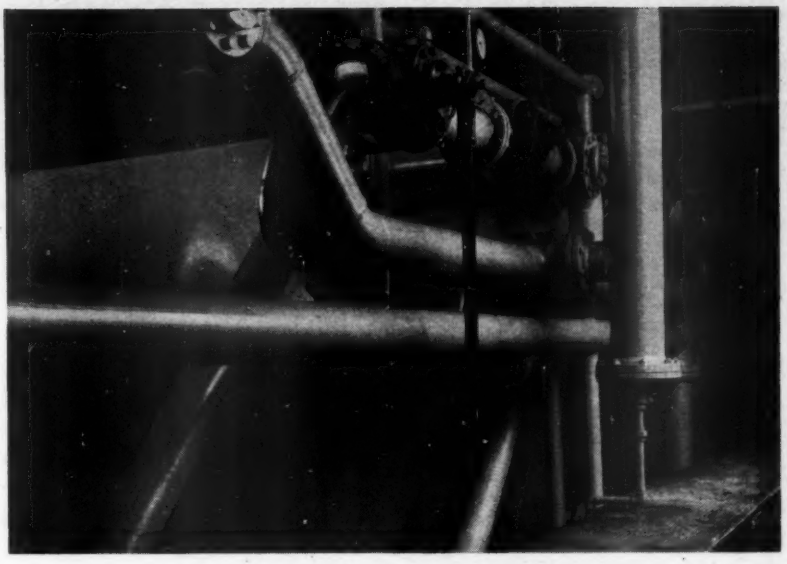
ventilating fan, etc. The precipitators are protected against any possible explosion while in operation by Minneapolis-Honeywell Protectoglo units which automatically cut off the electric current to the precipitators in the event that flame failure occurs due to faulty operation of the reformed gas make.

(e) Gas holder.—The reformed gas leaving the precipitators is mixed with the straight still-gas while flowing to the 400,000 cu. ft. capacity wet-type holder. The function of the gas holder is to take care of a short storage period for the mixed gas, namely, 1 or 2 hours, in the event of temporary shutdown of the reforming units due to power failure. The storage of gas in the holder permits the gas compressors to continue operating for such time, until the power service is restored.

(f) Steam boilers for heating.—The plant buildings are heated with three 40-hp. Leonard steam boilers which are gas fired. These boilers are designed for coal firing and will later be converted to stoker firing just as soon as the stoker equipment can be obtained. The gas-holder tank is heated with hot water from the gas-engine compressor jackets. The holder cups are heated with hot water through heat exchanger and steam from the boilers. No steam is required for the actual reforming process.

(g) River-water pumps and booster pumps.—The water used at the plant is supplied from its river pumping station located on the Union Gas property at the river front. Two 1,400 g.p.m. 90-ft. head, centrifugal pumps which are driven by 40-hp. electric motors, take water from the St. Clair River through a 16-in. intake. One pump only is ample for the normal operation of the plant. The water is delivered to the plant through a 10-in. C.I. pipe to the water-booster pumps located in the boiler house. The booster pumps furnish water to the washer-coolers and the gas-holder cups at necessary head. The cooling water for the gas-engine compressors is supplied direct from the river pumps. In the event that the electric power fails, the booster-pump piping is so arranged and designed to take water from the gas-holder tank. This is accomplished by suitable pressure regulators which work automatically to supply water to the gas-compressor jackets, thus allowing the compressors to keep operating for a period of 60 to 90 minutes and maintain delivery of mixed gas to the system until the power is restored.

(h) Gas-engine compressors. — The compressors at the Sarnia reforming plant consist of four units of 400-hp. Clark Brothers two-cycle right-angle gas-engine-driven compressors, each of 2,410,000 cu. ft. capacity at 175 lb. discharge pressure based on atmospheric intake pressure. The four power cylinders are 14-in. bore with 14-in. stroke and are direct connected at right angles to two 17-in. double-acting low-stage compressor cylinders and one double-acting high-stage cylinder for each unit. The compressors are equipped with Ross intercoolers and aftercoolers.



Sulfur purifier tanks and manifold piping

Type of electric power supplied to Sarnia plant.—All power for operating the various motors in the plant for air blowers, water, oil, lime-slurry pumps, etc., is supplied by the Hydro-Electric Power Commission of Ontario. The incoming current is a high tension 4,400 volts, three-phase, 25-cycle line. This current is transformed by a bank of three 75-kva. transformers to 575 volts for the plant power motors. One 25-kva. transformer of 4,400/115 volts is used for the lighting lines in the plant.

Excess gas storage at the Dawn compressor station. — During the warmer months of the year when the gas-sales volume is less than the volume of mixed-gas sendout from the reforming plant, it is necessary to store the excess gas due to the fact that the refinery still gas is purchased on a daily basis of its entire supply throughout the year. Moreover, the still gas volume available is greatest during the summer months.

The excess mixed gas which is delivered to the system from the reforming plant, is drawn off at the Dawn compressor station (located about 25 miles southeast from the Sarnia reforming plant) and pumped into the Dawn field underground storage for winter peak loads and future use.

The compressor station at Dawn consists of three 300-hp. Clark Brothers Type RA3 angle gas-engine-driven compressor units. Each unit has a capacity of 2,600,000 cu. ft. per day at 700 lb. pressure based on 100-lb. suction pressure. These compressors also serve as gas boosters to take gas from low-pressure natural-gas wells and pump it into the distribution system during peak-load periods.

Transmission and Distribution of the Reformed Mixed Gas

The mixed gas from the reforming plant after metering, is carried through a 12-in. line to the nearest point of the Sarnia natural-gas line where it travels north to supply the city of Sarnia and south to points of contact with the balance of the system—some of it mixing with the natural gas from the Dawn field and going to London—some of it mixing with the natural gas from the Dawn field and also the Dover and Chatham fields for use in Wallaceburg, Chatham and other markets along the Sarnia line. The balance passes from the Sarnia line at Port Alma into the Windsor line where it mixes with the supply from the D'Clute and Tilbury fields for use in the markets along the Windsor line and in the city of Windsor, Canada.

TABLE 1—Analyses of Gases

Col. No.—	1	2	3
	Still gas	Reformed gas	Mixed gas*
B.t.u. per cu. ft.	1,600.0	400.0	1,000.0
Specific gravity	.93	.77	.85
Carbon dioxide CO_2	0.0	1.8	0.9
Ethylene C_2H_4	11.5	6.7	9.1
Propylene C_3H_6	10.5	0.0	5.3
Oxygen O_2	0.0	0.2	0.1
Carbon monoxide CO	0.9	11.8	6.3
Hydrogen H_2	5.6	11.7	8.7
Methane CH_4	36.9	20.7	28.8
Ethane C_2H_6	20.8	0.0	10.4
Propane C_3H_8	10.7	0.0	5.3
Butanes C_4H_{10}	3.1	0.0	1.6
Nitrogen N_2	0.0	47.1	23.5
	100.0	100.0	100.0

*50 per cent still gas, 50 per cent refinery gas.

Oil-Well Pumping Practices—No. 8

Design of Sucker-Rod Strings

by J. Zaba

THE starting point of design of a pumping installation is the amount of fluid to be handled and the calculations involve selection of plunger, speed of pumping, length of stroke, sucker rods, etc. At the time selection of rods is made, the well loads are assumed to be known either through calculation or, if analysis is made as a corrective measure on an existing installation, through actual dynamometer measurements. As far as design of sucker rods is concerned, the two governing factors are the loads involved and the degree of corrosion expected.

In actual practice an attempt is made to keep the maximum working stresses of sucker rods below 30,000 lb. per sq. in. This stress corresponds about to the corrosion endurance limit of different steels shown in Table 1 of Installment 6, if one considers the fact that the values given in this table are for complete reversals of stresses and that in case of sucker rods, with stresses from zero to maximum tension, the value of the endurance limit would be about 1.5 times the values given in the table. The same would be true for certain steels under sulfide corrosion conditions.[1]

While 30,000 lb. per sq. in. is the upper limit of the desired stress it is customary to hold the stresses below this value to provide the proper safety factor. With the limiting stress thus selected and with the well load known, Fig. 1 (in Installment 7) provides general guide for the size of sucker rods needed. This chart, however, simply converts loads to stresses and could be used only if corrosion is known definitely not to be present. Because of effect of corrosion on the endurance limit not only each field, but practically each well becomes an individual problem and the selection of rod size and rod material has to be based on the best available results of laboratory tests on corrosion and sulfide-embrittlement-endurance limits of different steels. Quite often conditions of loads and corrosion are such that no rod can be found which offers the endurance limit above the expected working loads under a given set of conditions. In such a case next best possible rod has to be selected and particular attention should be directed in operation of the well toward eliminating any unnecessary stresses such as for instance those resulting from fluid pound.

Two general methods of designing a tapered sucker-rod string are discussed in this installment, the discussion being fully amplified by formulas and tables. This series began in the July 1 issue, with installments in each consecutive issue.

Table 1 based on laboratory tests of the S. M. Jones Co. offers a guide for selection of sizes and material of sucker rods now commercially produced for different types of pumping conditions.

Tapered Strings

With the advent of deep well pumping, the so-called tapered, or stepped, sucker-rod strings came into general use. The purpose of such a string is to decrease loads and investment and to provide for more uniform distribution of stresses.

There are two general methods of designing a tapered sucker-rod string. The first method is to assign to each of the graduated sections of the string its maximum stress. In other words, a point in the string is determined at which the stress in the rod equals the arbitrarily selected maximum safe working stress and from this point up, a larger size rod is used. The second method consists of designing the string in such a manner that the unit stresses are equal in the top rod of each of the different size sections of the string. The second method is safer since it provides for a greater safety margin as far as corrosion pitting is concerned. The two methods can be best illustrated by showing the manner in which the respective formulas, used for loads secured through calculations, are derived.

In case of the first method[2,3,4] the size of the rods in a string has to be increased at a point where the safe working stress equals the fluid load plus the weight of the first selected smallest section of the rods. This condition can be expressed in the following equation:

$$\Sigma a_1 = W_f C + R_1 W_1 C \qquad (1)$$

where

- S = the permissible unit stress in rods, lb. per sq. in.
- a_1 = area of rods in bottom section, sq. in.
- W_f = weight of fluid, lb.
- C = acceleration factor
- R_1 = length of bottom section of rods, ft.
- W_1 = weight per foot of bottom section rods, lb.

TABLE 1*—LABORATORY TESTS ENDURANCE LIMITS FOR SUCKER RODS

Rod—		Endurance values (lb. per sq. in.)	Size	Endurance values in pounds for each rod size: Air	Salt water	H_2S
S.A.E. 1335, approx. 1.75% manganese	Air	56,400	⅝-in.	17,300	9,030	3,710
	S.W.	29,400	¾-in.	24,900	13,000	5,350
	H_2S	12,100	⅞-in.	33,900	17,680	7,270
			1-in.	44,300	23,080	9,500
Low-manganese steel	Air	52,600	⅝-in.	16,150	6,730	4,950
	S.W.	21,900	¾-in.	23,250	9,700	7,120
	H_2S	16,100	⅞-in.	31,600	13,170	9,680
			1-in.	41,300	17,200	12,630
S.A.E. 1045	Air	51,600	⅝-in.	15,850	6,110	3,350
	S.W.	19,900	¾-in.	22,800	8,800	4,820
	H_2S	10,900	⅞-in.	31,000	11,950	6,550
			1-in.	40,500	15,620	8,550
Nickel-molybdenum low-carbon steel	Air	45,100	¾-in.	19,920	11,230	9,700
	S.W.	25,400	⅞-in.	27,100	15,250	13,170
	H_2S	21,900	1-in.	35,400	19,930	17,200
S.A.E. 4620	Air	52,500	⅝-in.	16,120	10,170	6,910
	S.W.	33,100	¾-in.	23,200	14,620	9,950
	H_2S	22,500	⅞-in.	31,550	19,900	13,520
			1-in.	41,200	26,000	17,660

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Solving for R_1:

$$R_1 = \frac{Sa_1 - W_f C}{W_1 C} \quad (2)$$

For second section of rods:

$$Sa_2 = W_f C + R_1 W_1 C + R_2 W_2 C = Sa_1 + R_2 W_2 C \quad (3)$$

where

a_2 = area of rods in second section of rods, sq. in.
R_2 = length of second section of rods, ft.
W_2 = weight per ft. of second section of rods, lb.
and other symbols as in Equation (1)

Solving for R_2:

$$R_2 = \frac{Sa_2 - Sa_1}{W_2 C} \quad (4)$$

Similarly for third section

$$R_3 = \frac{Sa_3 - Sa_2}{W_3 C} \quad (5)$$

where R_3, a_3, W_3 denote respective properties of the rods in the third section of the string,

The weight of the fluid W_f can be figured from:

$$W_f = AWL \quad (6)$$

where

A = area of plunger, sq. in.
W = hydrostatic pressure exerted by 1 ft. of fluid = 0.43 lb. per sq. in. for water
L = setting depth of pump, ft.

Acceleration factor, as recommended by Rieniets:[5]

$$C = 1 + \frac{b^2 s}{g} \quad (7)$$

where

b = angular velocity, radians per second
s = one-half the polished-rod strokes, ft.
g = gravitational constant—32.2 ft. per second per second

Substituting these two values for fluid weight and acceleration factor in Equations (2), (4) and (5) the formulas for length of the respective sections of the string are:

$$R_1 = \frac{Sa_1 - AWL\left(1 + \frac{b^2 s}{g}\right)}{W_1\left(1 + \frac{b^2 s}{g}\right)} \quad (8)$$

$$R_2 = \frac{Sa_2 - Sa_1}{W_2\left(1 + \frac{b^2 s}{g}\right)} \quad (9)$$

$$R_3 = \frac{Sa_3 - Sa_2}{W_3\left(1 + \frac{b^2 s}{g}\right)} \quad (10)$$

While the formulas appear complicated they are easily solved. Areas of rods can be obtained from Table 1, Installment 7. Areas of plungers are shown in Table 2. Values of acceleration factor $1 + b^2 s/g$ for different combinations of speed and stroke are shown in Table 3.

TABLE 2—PUMP-PLUNGER AREAS

Diameter (in.)	Area (sq. in.)
1	0.78
1¼	1.23
1½	1.77
1¾	2.41
2	3.14
2¼	3.98
2½	4.93
2¾	5.94
3	7.07
3¼	8.30
3½	9.62

In case of the second method[3,6] the unit stress in top rod of each section of the tapered string has to be determined and the stresses so determined have to be equal. Assuming a two-section string, this unit stress for the top rod of the lowest section is:

$$\frac{[W_f + W_1(L - R_2)]C}{a_1} \quad (11)$$

where the symbols are the same as in previous equations.

For the top rod of the top section the unit stress is:

$$\frac{[W_f + W_1(L + R_2) + W_2 R_2]C}{a_2} \quad (12)$$

These two stresses have to be equal. In equating, the acceleration factor can be eliminated and the equation can be written

$$\frac{W_f + W_1(L - R_2)}{a_1} = \frac{W_f + W_1(L - R_2) + W_2 R_2}{a_2} \quad (13)$$

By substituting the values and solving for R_2 the length of the upper section of the string is calculated. This value subtracted from the total length gives the length of the lower section.

If the calculations involved in solving the formulas appear too complicated, use can be made of recommendations of sucker-rod manufacturers for different combinations of string. These recommendations are given for average normal conditions. Quite often, special difficulties are experienced in the smaller rod section of the string. Such cases require

TABLE 3—ACCELERATION FACTORS FOR PUMPING WELLS

Calculated values for $1 + \frac{b^2 s}{g}$

S.p.m.	Polished-rod strokes—in inches													
	18	22	24	26	30	32	34	42	44	54	64	74	120	132
10	1.026	1.031	1.034	1.037	1.043	1.045	1.048	1.060	1.063	1.077	1.091	1.105	1.171	1.188
12	1.037	1.045	1.049	1.053	1.061	1.066	1.070	1.086	1.090	1.111	1.131	1.152	1.246	1.270
14	1.050	1.061	1.067	1.072	1.084	1.089	1.095	1.117	1.123	1.151	1.178	1.206	1.335	1.368
16	1.066	1.080	1.087	1.095	1.109	1.117	1.124	1.153	1.160	1.197	1.233	1.269	1.437	1.481
18	1.083	1.101	1.110	1.120	1.138	1.147	1.157	1.194	1.203	1.249	1.295	1.341	1.553	1.608
20	1.102	1.125	1.136	1.148	1.171	1.182	1.193	1.239	1.250	1.307	1.364	1.421	1.683	1.751
22	1.124	1.151	1.165	1.179	1.207	1.220	1.234	1.289	1.303	1.372	1.441	1.509	1.826	1.909
24	1.147	1.180	1.197	1.213	1.246	1.262	1.279	1.344	1.361	1.442	1.524	1.606	1.983	2.082
26	1.173	1.211	1.231	1.250	1.288	1.308	1.327	1.404	1.423	1.519	1.615	1.712	2.154	2.269
28	1.201	1.245	1.268	1.290	1.335	1.357	1.379	1.468	1.491	1.602	1.714	1.825	2.338	2.472
30	1.230	1.282	1.307	1.333	1.384	1.410	1.435	1.538	1.563	1.691	1.819	1.947	2.536	2.690
32	1.262	1.320	1.350	1.379	1.437	1.466	1.495	1.612	1.641	1.787	1.932	2.078	2.748	2.923
34	1.296	1.362	1.395	1.428	1.493	1.526	1.559	1.691	1.724	1.888	2.052	2.217	2.973	3.171
36	1.332	1.406	1.442	1.479	1.553	1.590	1.627	1.774	1.811	1.996	2.180	2.364	3.212	3.433
38	1.370	1.452	1.493	1.534	1.616	1.657	1.698	1.863	1.904	2.109	2.315	2.520	3.465	3.711
40	1.410	1.501	1.546	1.592	1.683	1.728	1.774	1.956	2.100	2.229	2.457	2.684	3.731	4.004

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individual studies. Table 4 gives recommendations of the S. M. Jones Co. for different combinations of sucker-rod strings. The combinations are calculated to give the same unit load on top rod of each section.

TABLE 4—SUCKER-ROD COMBINATIONS IN TAPERED STRINGS*

1, ⅞ and ¾-In. Combination

Plunger	Per cent of 1-in.	⅞-in.	¾-in.
1 -in.	21.40	22.00	56.60
1 1/16-in.	22.30	22.25	55.45
1¼-in.	23.15	23.85	53.00
1½-in.	24.85	26.05	49.10
1¾-in.	25.95	28.65	45.40
2 -in.	29.35	31.85	38.80
2¼-in.	32.05	35.35	32.60
2 1/16-in.	34.25	39.15	26.60
2¾-in.	38.45	43.55	18.00
3¾-in.	58.20	41.80	....

1 and ⅞-In. Combination

Plunger diameter	Per cent 1-in. needed
1 -in.	22.7
1 1/16-in.	23.1
1¼-in.	24.3
1½-in.	26.2
1¾-in.	28.4
2 -in.	30.9
2¼-in.	33.8
2 1/16-in.	36.2
2¾-in.	40.6
3¾-in.	58.2
4 -in.	58.5

⅞ and ¾-In. Combination

Plunger diameter	Per cent ⅞-in. needed
¾-in.	23.8
13/16-in.	24.6
1 -in.	25.0
1 1/16-in.	25.5
1¼-in.	27.3
1½-in.	29.1
1¾-in.	32.9
2 -in.	36.5
2¼-in.	40.6
2 1/16-in.	44.0
2¾-in.	50.2
3¾-in.	75.4

¾ and ⅝-In. Combination

Plunger diameter	Per cent ¾-in. needed
¾-in.	27.0
13/16-in.	28.9
1 -in.	29.6
1 1/16-in.	30.5
1¼-in.	33.2
1½-in.	37.4
1¾-in.	42.3
2 -in.	48.2
2¼-in.	54.4
2 1/16-in.	59.8
2¾-in.	69.7
3¾-in.	...

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Load-Cushioning Devices

Since the fatigue of rods is affected both by peak load and range of loadings, attempts have been made, particularly in case of heavy wells, to level out the normal peak loads, imposed on sucker rods by normal operations and the shock loads resulting from any one of many possible causes. Several devices designed to accomplish this purpose are commercially produced and successfully used.[7,8,9] The basic principle is to eliminate the rigid connection between rod string and beam by arranging for an elastic, compressible link between polished rod and the beam. This can be accomplished in several ways. For instance, a rubber cushion device is set between the carrier bar of the beam hanger and the polished-rod clamp. When any load is picked up suddenly the rubber is compressed, causing the polished rod to lag behind the action of the beam, decreasing the impulse acceleration factor. The energy stored in the compressed rubber is then gradually released, causing the load to be spread over longer period. The device using compressed air as a cushioning medium consists of a cylinder attached to the beam with the rod string connected to the rod of a piston which moves in the cylinder. Sufficient air pressure is maintained in the cylinder under the piston to support the piston at the top of the cylinder against the weight of rods. When the fluid load is picked up, the piston is drawn down part way, through the cylinder, thus decelerating the speed of polished-rod in relation to the beam. When the peak load is passed, the compressed air pushes the piston to the top of cylinder increasing the load. The result is more even distribution of loads and therefore the reduction of peak loads.

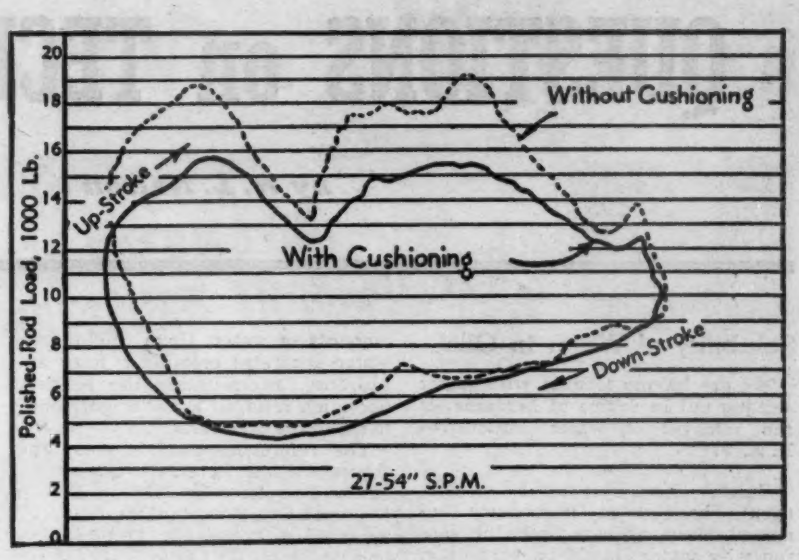

Fig. 1—Effect of load-cushioning device. (Reproduced from J. F. Eaton: "Tests Indicate Sucker-Rod Loads May Be Reduced"—Drilling and Production Practice, A.P.I., 1936)

The dynamometer card shown in Fig. 1 illustrates the effect of rubber cushioning device on peak loads and range of loadings.

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Slow Pumping Rates

(Continued from Page 50)

assuming an increase to 3,000 bbl. of oil per 1 per cent water increase, between the 85 to 97 per cent water point 36,000 bbl. of oil would be recovered for an ultimate recovery of 187,000 bbl. This would show an estimated 26,000 bbl. more recovery as a result of the slower withdrawal.

The effect of the slow rates of fluid withdrawal upon oil recovery in relation to the volume of water produced is further depicted in Fig. 2, based on the production records of a certain well. In this case during the period the well was produced at the rate of approximately 15 bbl. of fluid per hour, the oil recovery was at the rate of only 168 bbl. per 1 per cent increase in water production. When the withdrawal rate was reduced to approximately 9 bbl. of fluid per hour, the recovery rate was increased to 938 bbl. of oil per 1 per cent water increase. After the well had produced slightly over 20,000 bbl. of oil, the withdrawal rate was increased to approximately 11 bbl. of fluid per hour, resulting in a reduction in the oil recovery rate to 388 bbl. per 1 per cent water increase.

QUESTIONS on TECHNOLOGY

by W. L. Nelson

Solubility of Water in Oils

We are having trouble with water settling out in drums of kerosene. Is the removal of water difficult?—R. A. V.

Unless some chemical treating agents have been improperly removed, there appears to be no reason why water should be present in kerosene, except the small amount that dissolves in the kerosene.

The following table indicates the approximate solubility of water in various oils. Not very complete information is available, possibly because the solubilities are so small that they are usually not of great importance.

SOLUBILITY OF WATER IN OILS, PER CENT

Temp., °C.	Gaso. or naphtha	Kerosene	Lube oil
10	.004	.003	.002
20	.007	.005	.004
50	.030	.024	.013
70	....	.046	....
95	....	.098	.060

These average values are altered somewhat by such factors as the amount of aromatic hydrocarbons in the oil (water is more soluble) and by soap-like materials that may be left in the oil by improper washing after chemical treatment. The latter is mentioned by Gurwitsch as an explanation for the behavior of some transformer oils that appear to be hygroscopic.

By noting the tabulation it can be seen that small amounts of water could separate from kerosene during wide changes in climatic temperatures. Thus, a decrease in temperature from 100° F. to 50° F. would separate about 0.012 per cent of water. It should also be noted that water will be supplied by the air to the oils even if they are completely dry when they leave the refinery.

Even these traces of water are detrimental to the dielectric strength of transformer oils. When water is introduced in the small amount of 0.005 per cent to a completely dry oil, it decreases the dielectric strength to half.

Moisture is usually noted in lubricating-oil products as they flow from refinery equipment. In such equipment the oil is at a high temperature and it dissolves relatively large amounts of water. Upon cooling, the water separates creating a hazy appearance, necessitating the refinery operation referred to as "brightening" to make the oil clear.

The references used in compiling the tabulation were: (1) Gurwitsch-Moore, Petroleum Technology, D. Van Nostrand Co., 1931. (2) Dunstan et al, Science of Petroleum, Oxford University Press. (3) Leslie, E. H., Motor Fuels, Chem. Catalog Co., 1923. (4) Groschuff, E., Z. fur Elektrochemie 17, 348 (1911). (5) Flowers & Dietrick, Power 75, 232 (1925).

Purpose of Pipe Dope

What is the reason for using pipe compound?—A. M.

Pipe or joint compound is used for two purposes. Primarily its function is to lubricate the threads so that they slip smoothly over one another without extreme friction. Secondly, pipe compound may be used to seal or cement the joint together. Obviously, a cement-type material must be used for the second purpose.

The situation may be judged by the following quotations:

Walker and Crocker, Piping Handbook, page 338, McGraw-Hill Book Co., Inc., 2d ed. 1931.

"Pipe threads are necessarily somewhat imperfect and to insure tightness, as well as to lubricate them while being screwed up, some form of compound is used. As a lubricant, only a light oil is satisfactory and, if the threads are very well made, this is sometimes sufficient. In plumbing work, white lead or red lead is usually used. For steam piping, a prepared paste containing oil and a filling material quota is generally used. Recently a compound containing powdered zinc has been used with much success in making tight joints. A mixture of litharge and glycerin is satisfactory for making tight joints against fluids, such as oils which are difficult to hold, but joints made up with this compound are difficult to break."

R. G. Lovell, Refinery Piping Providing for Expansion in Hot Lines (one of several articles on Refinery Piping Design), Petroleum Engineer, page 27, July 1941.

"There is only one reason to use any dope on pipe threads, and this in order to lubricate the rough surfaces left by the thread cutting so that the joint will make up tightly without the heat of friction causing the metal to expand and leave the joint loose when cold. The idea that the pipe dope can safely compensate for lack of tight metal-to-metal contact is altogether fallacious. A small amount on the first few threads on the male end is sufficient."

Perry, Chemical Engineer Handbook, McGraw-Hill Book Co., Inc., New York, page 816, 1934.

"To lubricate pipe threads and to insure their tightness, some form of lubricant must be used. For this purpose there are a large number of materials such as oils and mixtures of oil and graphite. To insure tightness of joints, (1) a mixture of litharge and glycerin, and (2) red lead and glycerin are used."

Lubrication is such an important function because it reduces thread friction. In this respect pipe dope is often referred to as the plumber's helper. Without lubrication rough or ill-cut threads tend to tear one another, leaving openings through which leaks can occur. In extreme cases the threads may actually freeze or seize into almost a continuous metal making a joint that cannot be unjointed without great force—a force that often strips the threads. In summary, the lubricant value of the pipe compound permits the joint to be pulled up tightly without damage to the threads, and thus produce a tight joint.

Cement-type pipe compounds, such as litharge and glycerin, are useful when the gas or liquid that is to be handled tends to dissolve into nonsetting pipe compounds making them so thin that they wash out of the joint. The tendency to dissolve occurs regardless of the type of compound used, but the cement-type pipe compounds congeal or harden before leakage occurs. The great disadvantage with cement-type joint compounds is the difficulty often encountered in "breaking" down the joint at some later date. It should also be noted that most commercial pipe compounds do harden slowly to a cement-type joint but not as rapidly as what is here referred to as cement-type compounds.

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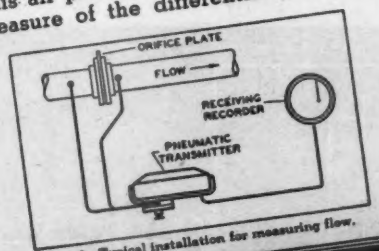

Fig. 2—Typical installation for measuring flow.

Fig. 3—Typical installation for measuring liquid level.

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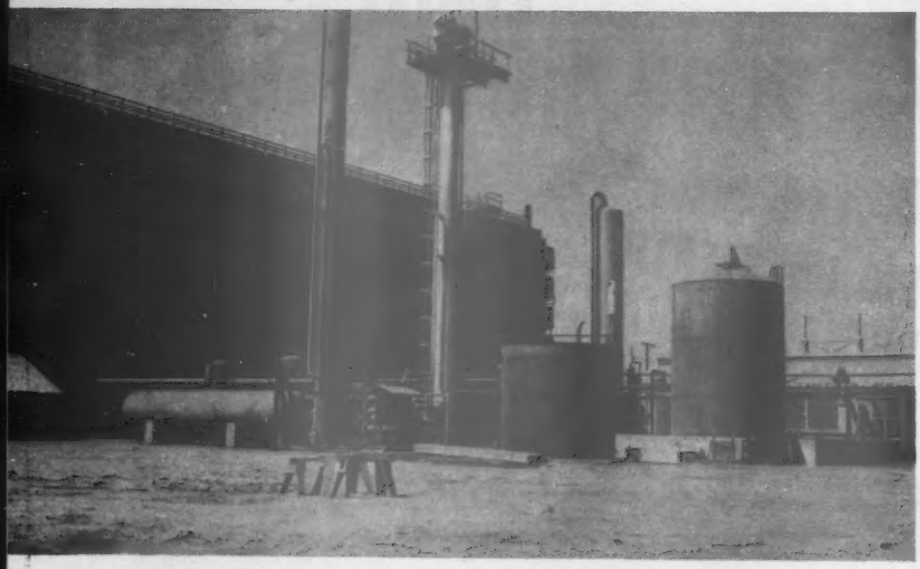


Gasoline plant using hot reflux to control still operation

Hot Reflux to Still Improves Plant Operation

A SUBSTANTIAL reduction in the quantity of recompressor vapors handled by the engines has been obtained by a gasoline company operating on the West Coast because of a few relatively simple and inexpensive changes in the operation of one of its plants. Due also to these improvements in operating procedure, the temperature of the raw gasoline received in the final accumulator drum has been lowered approximately 25° F. The results obtained can be credited largely to the use of hot reflux pumped back to the top of the still instead of the cold, raw gasoline from the final accumulator as in previous operation.

The natural-gasoline plant was built principally of material salvaged from a plant which had been operated in an old settled field where the composition of the gas was fairly constant and could be processed with a low oil-gas ratio in the absorbers. The distillation section, the still itself in particular, was designed originally to process a maximum of 500 gal. of rich oil per minute, and the column was equipped with internal plates considered efficient by design engineers when it was made. While the engines were being set on the concrete foundation blocks and other units arranged for operation, the still was revamped by changing it from a dephlegmating unit to a tower containing modern plates and bubble caps with downcomers having ample capacity to handle 600 gal. of absorption oil per minute. Nozzles and fittings were added for operation with liquid reflux pumped back to the top plate for product end-point control.

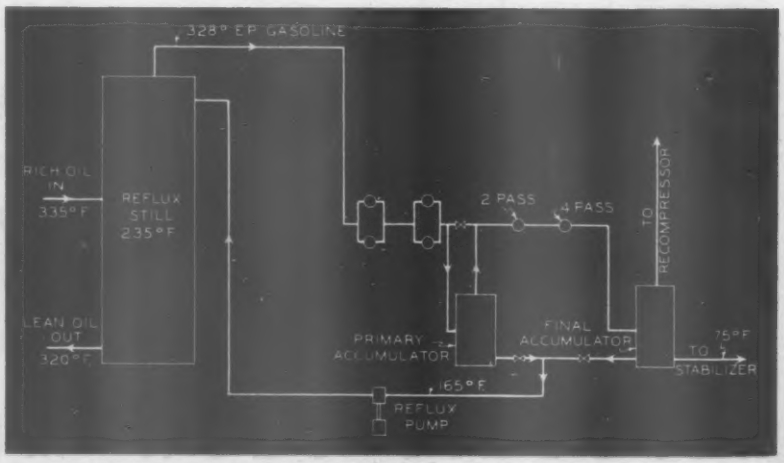
Gasoline-vapor cooling and condensing sections were installed with sufficient capacity in the water tower to liquefy gasoline of average composition manufactured from a gas produced from flowing or pumping wells operated with a low tubing and separator pressure. Because of production restrictions, allowables and other conservation programs applied to this particular area, the composition of the gas was found to contain a predominance of C_4 and lighter fractions as shown in the table:

WET-GAS ANALYSIS

Fraction—	Per cent by volume— Gal./Mcf.	Per cent
CO_2	....	5.10
Methane	....	76.39
Ethane		6.68
Propane	1.556	5.67
i-Butane	.219	1.67
n-Butane	.744	2.36
Pentane plus	.832	2.13
	3.351	100.00

Since the construction and layout of the piping of the plant in the condenser sections allowed only raw gasoline from the final accumulator to be pumped to the still as reflux, this practice was followed for some months after the plant started operating. As additional wells were drilled in the vicinity supplying a greater volume of gas for processing, the amount of the recompressor vapors mounted steadily, and the temperature of the gasoline in the accumulator rose to around 100° F. The obvious solution to this problem would have been to install additional vapor condensers, perhaps another bay to the cooling tower and larger water-pump facilities, all of which would have increased investment in the plant substantially.

The objective desired by the management was to produce as much propane, iso and normal butane as possible. The normal butane in sufficient quantity to maintain the standard boiling range and vapor pressure of the natural gasoline and a surplus above this requirement to be blended with propane to supply L.P.G. The i-butane, obviously, is necessary as charging stock in plants occupied



Flow diagram of gasoline plant employing a hot reflux system

with processes to manufacture synthetics and other vital products. The high temperature of the condensate in the final coolers prevented adequate liquification of desirable products and the great volume of uncondensed gases passed on to the overloaded recompressor.

After checking into all angles of plant operation, the time required to secure additional cooling sections, another bay to the cooling tower, greater water-pump capacity and additional power, it was decided to break away from routine operations and establish a different method of still control, never before applied to a gasoline plant operating in this oil-producing area. Results obtained have justified the change in still control.

It is not too difficult to understand what takes place in the top of the still and in the vapor condensers when raw gasoline as reflux is pumped back for column control. The hot gasoline vapors and the absorption oil rising to the top plate either as a vapor or carried mechanically cause the reflux to flash to a vapor immediately and with little effect on the washback. The vaporized reflux, which has served no useful purpose crowds with the gasoline to the condensers and coolers where a great transfer of heat must be accomplished if effective condensation is obtained. Taking all of these things into consideration, the manager of the plant decided that, if partial condensation could be obtained in the first few sections of the vapor coolers with the resulting liquid pumped back to the still without additional cooling, the problem of the overloaded recompressor engines and abnormally high temperature in final condensers should be eliminated.

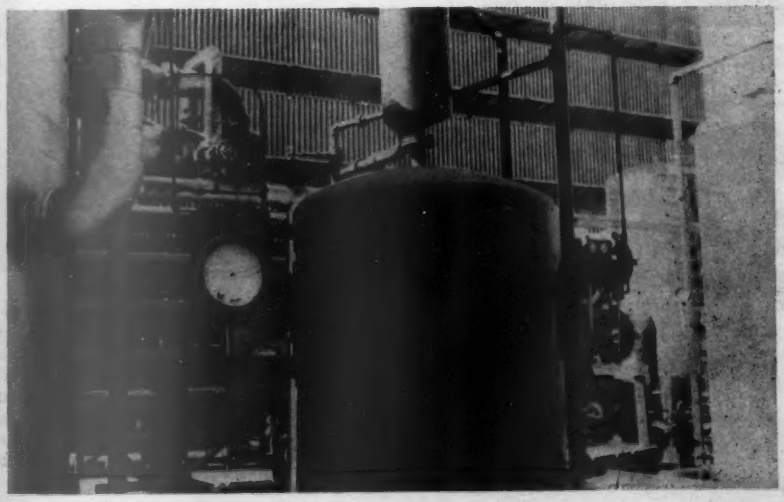
The condensers and vapor coolers were originally installed with the first four units set in pairs for parallel flow, and the second two units piped for series operation. The first four have tubes and heads to provide a two-pass operation, and the first unit of the second section arranged likewise. The final cooler is a four-pass unit emptying directly into the final accumulator where the raw gasoline is collected. The change in layout consisted of setting a takeoff in the transfer line between the first and second set of condensers, but leaving facilities for return to the original plan if necessary. A primary accumulator was hooked into this takeoff so that both fluid and vapors flow unrestricted into the vessel and on to the second set of condensers. The suction line to the reflux pump was connected to both the primary and secondary accumulators. Liquid collected in the first, or primary, accumulator has a temperature around 165° F., and its characteristics are shown as follows:

HOT REFLUX DISTILLATION

A.P.I. gravity	76.1°
Reid vapor pressure, lb.	24.5
I.B.P., °F.	65
5 per cent over	83
10 per cent	94
20	111
30	133
40	152
50	172
60	189
70	208
80	238
End point	378

Immediately after reflux of the above type was started over the still, the volume of vapors handled by the recompressor dropped from a daily average of 1,250,000 cu. ft. to 600,000 cu. ft., and the temperature of the gasoline in the final accumulator dropped from an average of 100° F. to an average of 75° F. The quantity of reflux was cut from about 5:1, to 2.18:1, measured by orifice meter, and calculated on the basis of reflux pumped back to the still, to the amount of gasoline produced.

The absorption and distillation systems are operated with a kerosene distillate having an A.P.I. gravity of 41° and is manufactured from crude produced in the immediate area served by the gasoline plant. This type and origin of absorption oil was secured so that the plant efficiency would be increased, assuming that an absorption oil produced from a certain area would have a greater affinity for lighter fractions than one manufactured from unrelated crudes. The amount of absorption oil circulated is at a ratio of 40 gal. per 1,000 cu. ft. of wet gas, and is circulated at a rate of 700 gal. per minute, an apparent overload of 100 gal. per minute, but with no difficulty such as high end point or still puking. The still operates at 40 lb. per sq. in. and has a base temperature of 335° F. The top temperature is held at 235° F., and 0.213 lb. of process steam is used for each gallon of absorption oil passing through the still, all of which produces a gasoline having a consistent end point of 328° F.



Above: Primary accumulator from which hot reflux is pumped to still for control of operation. Below: Secondary or final accumulator in plant using hot reflux

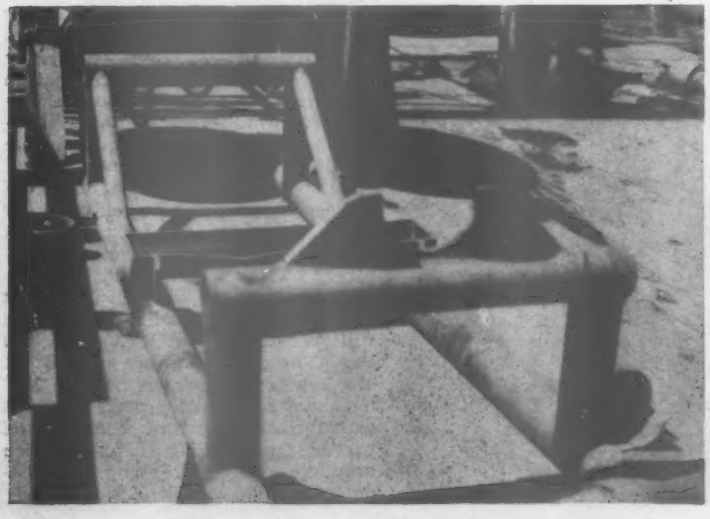
OPERATING IDEAS

Mud Degasser Eliminates Fire Hazard

WHEN drilling through high-pressure gas sands, the mud returns may carry a certain amount of gas that escapes to the air when the mud is charged to an open mud ditch. As a precaution against fire, one Gulf Coast operator encloses a portion of the wooden mud ditch from the well in the form of an elongated box, having a single vent near the center. Live steam is injected when the mud carries gas, thus preventing fire. Baffles in the enclosed ditch aid the release of the gas.

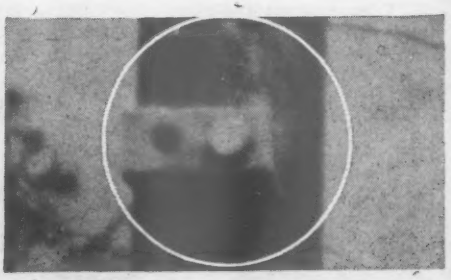
Shipping Rack for the Swivel

WHEN moving the drilling tools, protection can be furnished for the swivel when a shipping rack is available. One may be made with pipe for sills having vertical risers at each end, braced with cross-members, one of which is a short joint of smooth pipe, while the other is fitted with a saddle. Slings fitted around the rack provide lifting facilities when rigging cranes or a truck boom is employed.



Clamp Holds Measuring Line

MUCH of the annoyance of removing a bottom-hole bomb from the lubricator is eliminated by a small clamp attached to the lubricator near its bottom. The clamp consists of two small steel blocks, one with a tapped hole and threads welded to the lubricator and the other with a drilled hole. A stud is supplied for joining the two. After the bomb has been raised into the lubricator and the tubing gate closed, the measuring line is pulled down and clamped in place. As soon as the pressure is bled from



the lubricator, the union is broken and lubricator and bomb can be lowered to the ground. The clamp can then be loosened and the bomb pulled from the lubricator. The reverse procedure is followed when placing the bomb in the well. The guide pulled halfway down removes part of the strain from the lubricator when the bomb is being run or pulled from the hole.

ESTIMATING FUTURE OIL RECOVERY

ESTIMATING the future oil recovery for a well is perhaps the most frequent problem encountered in cost engineering. The decision to do any reconditioning or repair work depends to a large extent on the future well production and payout period.

An estimate of future production rates and total recovery to be realized from a well involves considerable guesswork at the best. Many operators keep detailed and voluminous data on this phase of operations and are able to make estimates which check quite closely with later results.

Several different methods for calculating future recovery are used, the particular method depending to a large extent upon the type of reservoir and past experience. It has been found that many wells producing from sandstone formations with no appreciable water encroachment follow a decline curve which plots as a straight line on semilog paper.

If the daily production rate (barrels per day) has been plotted on semilog paper over a sufficient period to establish the slope of the line, the daily production at any future date, as well as the decline rate and total recovery, can be calculated. Production-decline curves for two different wells are shown in the accompanying chart. In this particular case both wells produced 100 bbl. per day initially and gradually declined to a production rate of 10 bbl. per day, which was assumed to be the economic limit. The equation which expresses the decline curve is

$$y = Ce^{-kt}$$

Where,

y = production rate (bbl. per day)
C = initial production rate (at = 0), bbl. per day
t = time, years
k = a constant
e = base of natural logarithms

The value of the constant "k" can be determined if any two points (y_1, t_1 and y_2, t_2) on the straight line are known.

$$k = 2.303 \left(\frac{\log_{10} y_2 - \log_{10} y_1}{t_2 - t_1}\right)$$

In some cases when the slope of the decline curve has not been established, an arbitrary decline rate is used for a rough approximation of the future recovery. The particular decline rate selected usually is based on known decline rates for similar-type wells. In this case,

$$k = 2.303 \log_{10} \left(\frac{100}{100 - D}\right)$$

Where "D" is the decline rate in per cent per year each year. Values of k for various decline rates are as follows:

Decline rate in % per year per year	Value of k
10	0.104
20	0.223
30	0.357
40	0.511
50	0.694
60	0.917
70	1.215
80	1.610
90	2.303

The total recovery for any period covered by the curve is,

$$R = \text{Recovery} = 1/k\ (365y_2 - 365y_1)$$

where y_2 is the daily production rate at the beginning of the period and y_1 is the production rate at the end of the period.

Calculations involving the decline curves shown in the chart are made as follows:

Well A.—Initial production rate 100 bbl. per day, economic limit 10 bbl. per day. The slope of the curve has been established by a plot of reported well production vs. time. This line when extrapolated shows that the economic limit of 10 bbl. per day will be reached in exactly 6 years from the start of the period. In this case,

$$k = 2.303 \left(\frac{\log 100 - \log 10}{0 - 6}\right) = -0.384$$

The minus sign has no significance other than the fact that the production is declining rather than increasing. In practical calculations "k" is given a positive value. The estimated total recovery for 6 years of operation is:

$$R = 1/0.384\ (365 \times 100 - 365 \times 10) = 85{,}600 \text{ bbl.}$$

Calculating the decline rate,

$$\log \left(\frac{100}{100 - D}\right) = \frac{0.384}{2.303} \text{ and } D = 32 \text{ per cent per year per year.}$$

Well B.—Initial production rate 100 bbl. per day, economic limit 10 bbl. per day. The decline rate is not shown but an arbitrary value of 20 per cent per year per year (applicable to similar-type wells) is selected. In this case,

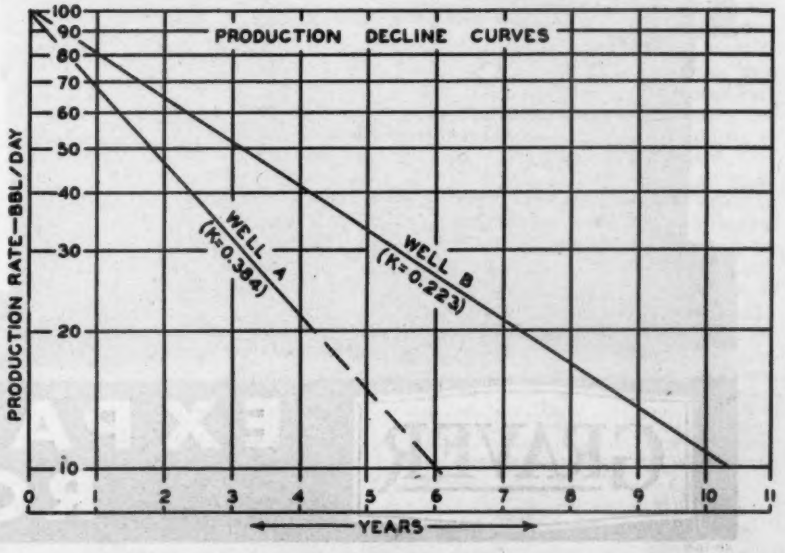
$$k = 2.303 \log \left(\frac{100}{100 - 20}\right) = 0.223$$

The time at which the well will reach the economic limit of 10 bbl. per day is:

$$t = 2.303 \left(\frac{\log 100 - \log 10}{0.223}\right) = 10.3 \text{ years.}$$

The estimated total recovery during the period of 10.3 years is

$$R = 1/0.223\ (365 \times 100 - 365 \times 10) = 147{,}400 \text{ bbl.}$$



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1 Saturated gasoline vapors expand 20% or more during summer months and contain 10 to 25 gallons of gasoline per 1000 cubic feet.

2 At this rate, an 80,000 bbl. cone roof tank, one-half full, containing 250,000 cubic feet of vapor space, would expel per day 50,000 cubic feet of saturated vapor containing as much as *1000 gallons of gasoline.*

3 Furthermore, a 4% evaporation loss results in a 3 point drop in octane rating.

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Engineering Fundamentals

No. 101

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

ABSOLUTE POROSITY OF CORES

THERE are two widely used methods for determining the absolute porosity of consolidated formation samples; namely, the Russell method and the Melcher-Nutting method. These methods have been modified since they were first originated, but in most laboratories absolute porosity methods now used closely resemble one of these general methods.

Russell Method

This method was described by Russell in 1926.* It was widely used for some time but has lately been superseded by other methods, principally due to the excessive length of time required for a determination. The Russell tube, however, is still widely used for volumetric measurements in core analysis work in connection with the newer porosity methods.

The Russell tube, which is the major item of equipment used in this procedure, is illustrated in Fig. 1. It consists of a glass bulb A to which are connected two graduated glass tubes B that converge into a common ground-glass joint C fitted with a removable glass bottle D. The volume of the bulb A below the lower graduation (a) is equal, or nearly equal, to the volume of the glass bottle D and other space above the upper graduation (b). If these volumes are not equal, a zero-point correction must be made in the course of the determination.

*Russell, A.A.P.G. Bull., 10, 93, 939 (1926).

Before using a core sample it should be extracted, dried, and trimmed to proper size.* The size of the sample should be such as to allow placing it into the removable bottle, D, without forcing. All loose grains should be removed from the sample. This may be accomplished by using a stiff-bristled brush.

The sample is next immersed in tetrachlorethane in a suction flask and thoroughly saturated under a vacuum. A suction flask arrangement suitable for this purpose is illustrated in Fig. 2. The dry core is placed in the bottle A which is also dry. Tetrachlorethane is contained in the separatory funnel B with the stopcock C closed. A vacuum is pulled on the sample, then, by means of a vacuum pump connected to the tube D. A manometer attached between the tube D and the vacuum pump will indicate the amount of vacuum obtained. When close to a perfect vacuum is obtained, the pump may be shut off and the stopcock C opened to saturate the core sample with the tetrachlorethane. Some testers do not consider it necessary to saturate the sample under a vacuum, but rather just immerse the sample in tetrachlorethane in an open container. It is better, however, to first evacuate the core of air in order to prevent the possibility of air entrapment which might later bubble out of the core in the Russell tube and reduce the accuracy of the results.

*Preparation of core samples for porosity tests will be discussed later in this series.

The Russell tube is placed in an upright position (same as in Fig. 1) and filled with tetrachlorethane to the zero graduation (a) or slightly above. A period of 5 or 10 minutes is allowed for all of the liquid to drain down from the inside surfaces of the tubes B, and then the level of the liquid in the tubes is read and recorded.

Next the saturated sample is taken from the suction flask and the excess liquid allowed to drain off. The specimen is now placed in the removable bottle of the Russell tube, stopcock grease applied to the ground joint, and the bottle fitted over the tube. The apparatus is now inverted and set in a vertical position with the removable bottle down. After a drainage period of about 10 minutes, a second volume reading is taken and recorded. The difference between the two readings (considering the volume correction between the two ends of the apparatus) gives the bulk volume of the sample.*

Next the sample is removed from the Russell tube, thoroughly dried in an oven, and crushed to individual grains in a mortar. This should be done carefully to avoid loss of any of the material. The grain volume is now determined by placing the individual grains in the tube using the

*If the readings are recorded in milliliters, they must be multiplied by two, since each tube is individually graduated. This is particularly an important point when making some volume measurements with the Russell tube and some with other apparatus as a part of the same determination.

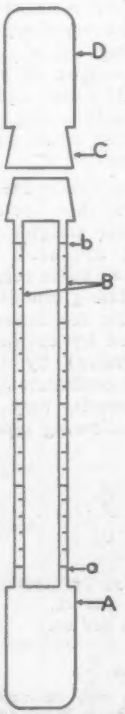

Fig. 1

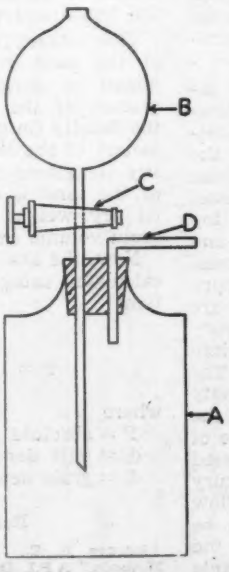

Fig. 2

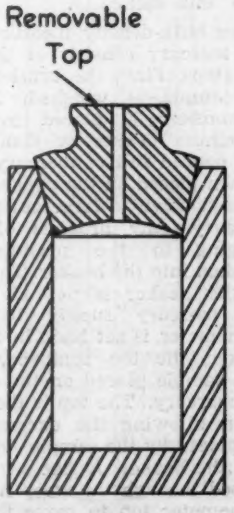

Fig. 3

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

same general method that was employed in obtaining the bulk volume.

The absolute porosity may be calculated from the recorded results using the following equation:

$$P = \frac{V - V_1}{V} \times 100$$

where

P = absolute porosity, per cent
V = bulk volume, ml.
V_1 = grain volume, ml.

Example 1

Problem.—A test was made with the Russell apparatus to determine the absolute porosity of a core sample. The following data were taken:

1. Zero-point correction: Reading on bulb end, 1.1. Corresponding reading on bottle end, 1.25.

2. Bulk volume: Reading before adding sample (bulb end), 0.64. Reading after adding sample (bottle end), 5.96.

3. Grain volume: Reading before adding grains (bulb end), 1.21. Reading after adding grains (bottle end), 5.22.

Calculate the absolute porosity of the sample.

Solution.—The zero-point correction, as shown by the data given is +0.15; that is, this amount must be added to a given reading in the bulb end to make it comparable to the corresponding reading on the bottle end of the tube for the same volume of liquid.

Then,

$$\text{Bulk volume} = 2[5.96 - (0.64 + 0.15)] = 10.34 \text{ ml.}$$

and,

$$\text{Grain volume} = 2[5.22 - (1.21 + 0.15)] = 7.72 \text{ ml.}$$

then

$$P = \frac{10.34 - 7.72}{10.34} \times 100 = 25.3\%$$

Melcher-Nutting Method

This method is more accurate than the Russell method. It depends solely on weight measurements which can be obtained with a high degree of accuracy on laboratory balances.

The core sample is cleaned, dried, and divided into two parts; one for the bulk-density determination, and one for the grain-density determination.

One of the samples is then weighed and dipped quickly into paraffin or collodion. The coated sample is then weighed again to determine the weight of the coating. The volume of the coating may be calculated using the density of the coating material. If paraffin is used it should be fairly cool (about ready to congeal) so that it will not enter the pores.

A pycnometer (illustrated in Fig. 3) is then used for determining the volume of the coated sample by the following method. The dry pycnometer is weighed. It is then filled with distilled water, the top pressed down to force out any excess water, dried on the outside with a clean cloth, and weighed again. By difference the weight of water in the pycnometer is obtained. Using water density tables, the density of water at the existing temperature may be read and used in calculating the volume of the pycnometer. The coated sample is placed in the pycnometer with the water and the top pressed down to force out the excess water. The pycnometer is carefully dried and weighed with the core sample and water in it. Since the weight of the pycnometer and the weight of the sample are known, the weight of water left in the pycnometer may be calculated by subtraction. This weight may be converted to volume using density tables and subtracted from the volume of the pycnometer to obtain the volume of the coated sample.

The volume of the coating is subtracted to obtain the volume of the original uncoated sample. The bulk density can now be calculated by dividing the weight of the uncoated sample in grams by the volume of the uncoated sample in cubic centimeters.

The above method of determining bulk density can be modified to considerably simplify and speed up the process without materially affecting the accuracy by using mercury instead of water as the displaced liquid in the pycnometer. This eliminates the necessity of using a coating on the sample and also eliminates a lot of the weighing.

Since mercury is so heavy, it is rather difficult to use it in a glass pycnometer without being troubled with breakage. Steel pycnometers are available, or may be made, to eliminate this difficulty.

The bulk-density measurement using mercury consists of the following steps. First, the brushed uncoated sample is weighed. Next, the pycnometer is placed in a clean aluminum beaker or similar vessel and poured full of mercury. The top is then placed on the pycnometer and pressed down to force out the excess mercury. Any droplets of mercury clinging to the pycnometer are brushed into the beaker. The mercury in the beaker is poured back into the mercury supply bottle. The pycnometer is set back in the empty beaker, the top removed, and the core sample placed on the surface of the mercury. The top is then pressed down allowing the excess mercury (displaced by the sample) to overflow into the beaker, A fine wire may be probed through the weep hole in the pycnometer top to move the sample about and allow the escape of any air that might be entrapped around the sample. All excess mercury on the outside of the pycnometer is carefully brushed into the beaker. The mercury in the beaker is then weighed, and its volume calculated using the density of mercury at the test temperature, which can be read from standard tables. This volume, of course, is the volume of the sample. The bulk density of the sample, then, may be calculated by dividing its weight by its volume.

A glass pycnometer should preferably be used for determining the grain density, if, in the interest of accuracy, the readings are to be restricted to weighing. It is also preferable to use tetrachlorethane rather than water in the pycnometer in order to insure more complete wetting of the sand grains. The density of the tetrachlorethane can conveniently be determined by weighing the pycnometer filled with tetrachlorethane then weighing it filled with water. The ratio of the net weight of water when multiplied times the density of water will give the density of the tetrachlorethane.

The sample is extracted, thoroughly dried in an oven, and crushed to grain size in a mortar. The sand grains are placed in a pycnometer and weighed. Tetrachlorethane is poured over the grains until the apparatus is filled. The mixture should be stirred gently with a wire to release any air bubbles from the sand grains.

The cover is placed on the pycnometer, excess liquid wiped from the outside, and the filled pycnometer is weighed. The weight of tetrachlorethane displaced by the sand grains is determined by adding the weight of dry sand to the weight of the pycnometer filled with the liquid (tetrachlorethane) and subtracting the weight of the pycnometer filled with the liquid and the sand.

The volume (in cubic centimeters) of the sand grains is then determined by dividing this weight (in grams) of the liquid displaced by the density (in grams per cubic centimeter) of the liquid. The grain density (in grams per cubic centimeter) of the sand is obtained by dividing its dry weight (in grams) by the grain volume (in cubic centimeters).

Now, the absolute porosity may be calculated using the following equation:

$$P = 100\left(1 - \frac{d_b}{d_g}\right)$$

where

P = absolute porosity, per cent
d_b = bulk density, g. per cc.
d_g = grain density, g. per cc.

References

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Twenhofel, W. H., and Tyler, S. A., "Methods of Study of Sediments," pp. 144-151, McGraw-Hill, 1941.

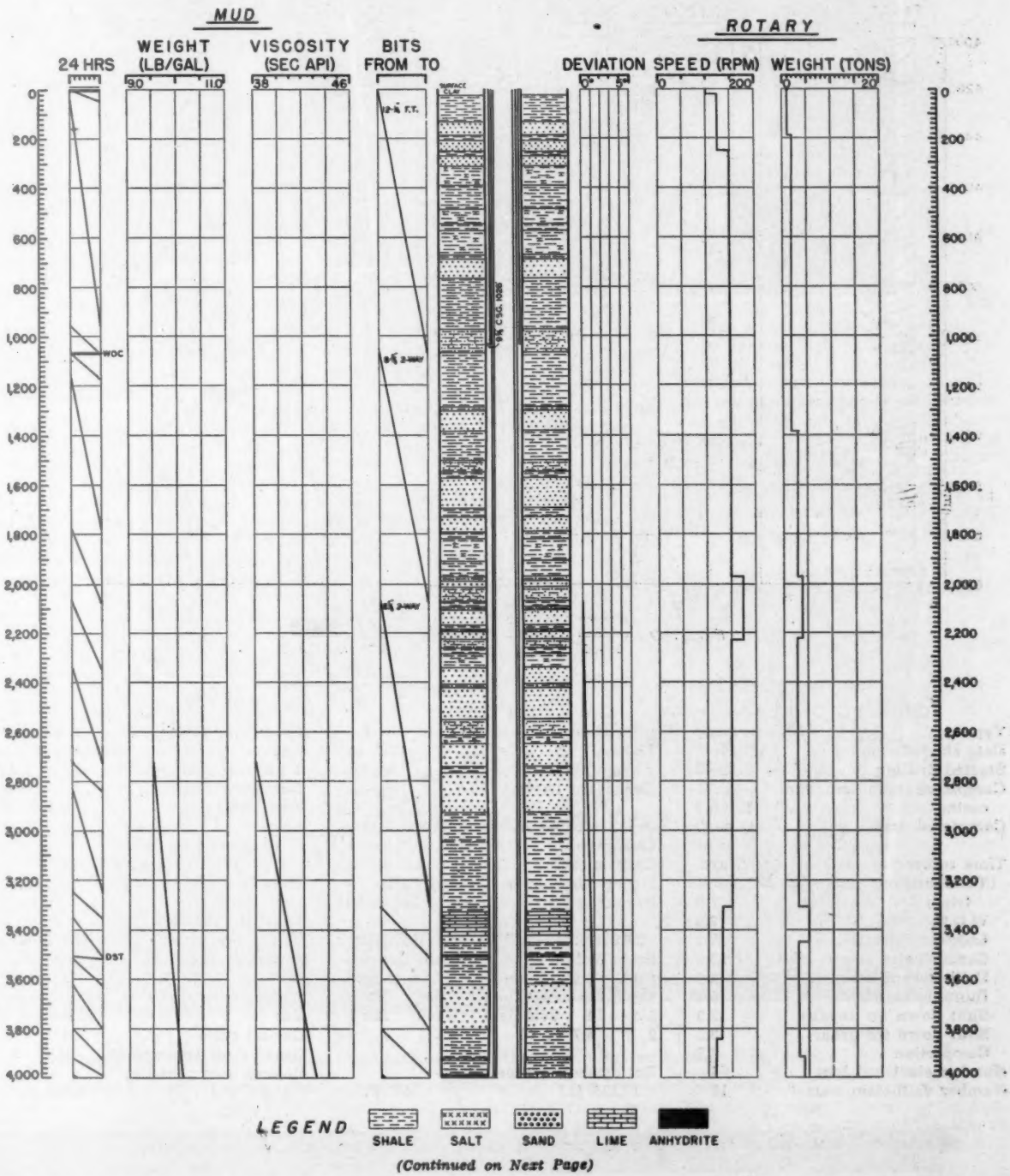
Discovery Well, North Magnolia City Field, Jim Wells County, Texas

HUMBLE OIL & REFINING CO. 1 M. A. EVETTS

Marcellino Lopez grant, Jim Wells County, Texas. Elevation 150 ft. (derrick floor)

CONTRACTOR

H. H. Howell, Alice, Texas



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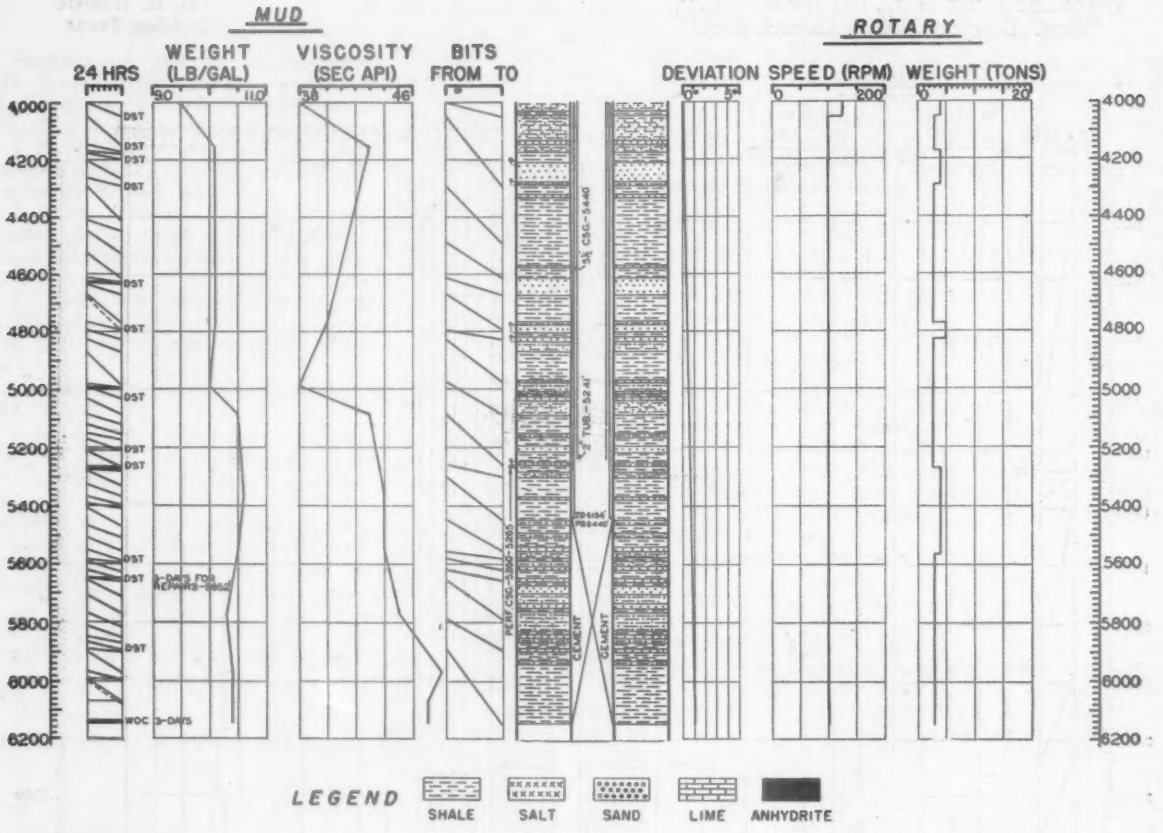
Discovery Well, North Magnolia City Field (Continued)



DRILLING DATA

Type rig	Steam rotary
Date started rigging up	3-10-43
Started drilling	3-12-43
Completed hole and ran casing	6- 4-43
Completed well	6- 9-43

Time record:	Days
Total drilling (includes trips)	32.9
W.O.C.	3.0
Logging (electric)	0.8
Coring (wire line)	23.5
Drill-stem tests	3.9
Running casing	0.8
Shut down for repairs	12.3
Shut down for orders	3.3
Completion	6.5
Number electrical logs	4
Number drill-stem tests	18

BITS USED

Type—	Number	Size
Fishtail	1	12¼-in.
2-Way blade	25	8¾-in.
Coreheads (A-1)	20	6¾-in.

MUD MATERIALS

Quebracho	1,520 lb.
Caustic soda	635 lb.
Hagan phosphate	2,850 lb.
Baroid	264 sacks

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Type	Depth (ft.)	Cement (sacks)
9⅝	32	Seamless	1,026	350
5½	14	Seamless	5,440	220
2	4.7	H-40	4,241	...

Bottom-hole temperature (5,225 ft.)	157° F.

COMPLETION

Producing zone (sand)	5,260-65 ft.
Method	Gun perforation
Time perforating	4 hr.
Number shots	48
Size shots	15/32-in.

PRODUCTION TEST

Time flowed	24 hr.
Size choke	½-in.
Tubing pressure	60 lb.
Casing pressure	Sealed
Separator pressure	25 lb.
Oil	121 bbl.
Water	Trace
Gas	45,000 cu. ft.
Gas-oil ratio	373
Gravity oil (corrected)	34.8°
Bottom-hole pressure (5,260 ft.)	2,193 lb.

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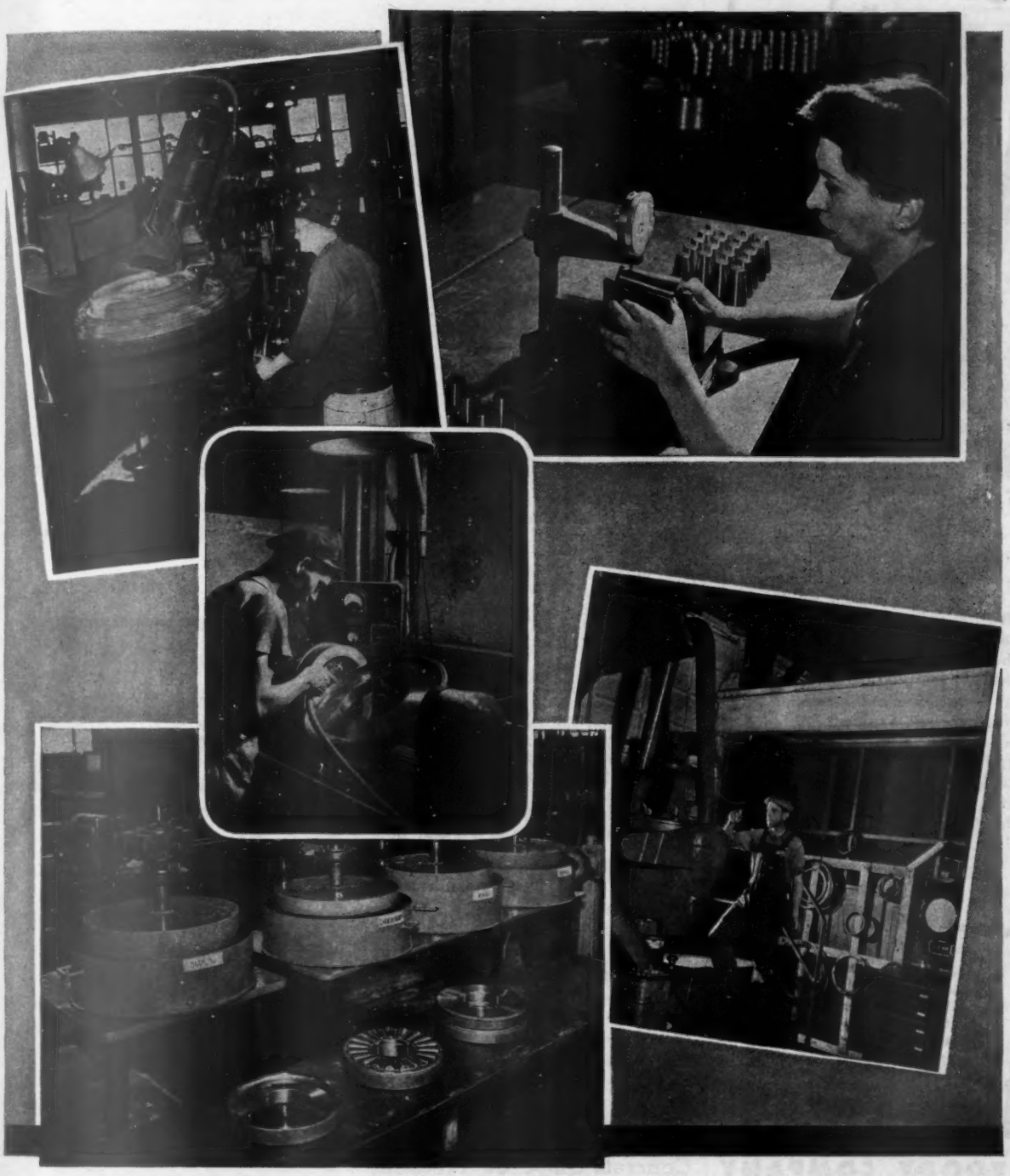

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REFINING

Eastern Plants Asked to Lift Yield of Two Products

WASHINGTON, D. C.—The Petroleum Administration for War has called upon East Coast (District 1) refiners to increase their production of home-heating oil and of 80-octane all-purpose military gasoline.

The request was contained in telegrams in which PAW informed the refiners that August crude-oil runs on the Atlantic seaboard will be limited only by the capacity of facilities.

Administrator Ickes said:

"Now that more and more crude oil is being made available to East Coast refineries, it is desirable that increased quantities of home-heating oil be produced so as to provide a 'cushion' for the winter months when demand is so great that we must dip into inventories. That is why refiners have been asked to make more fuel oil of this type even if, in so doing, they must reduce the quantity of residual fuel oil that is made."

Deputy Petroleum Administrator Ralph K. Davies said that lifting of quotas on crude-oil runs in eastern refineries is possible because of the increased transportation facilities now available on the East Coast. He said:

"The over-all transportation situation, so far as petroleum is concerned, is better than it has ever been since the war began. It is still improving. As a result, it is now possible to bring in more crude oil, and we can now authorize the East Coast refineries to operate without quotas on crude-oil runs.

"It is with considerable satisfaction that we make this announcement, for this is the culmination of a long-range planning program that was initiated many months ago by the Petroleum Administration for War in cooperation with the petroleum industry, the railroads, the pipe-line companies, and waterway transportation operators."

Maritime Commission Trims Concrete-Oil-Barge Program

Reducing the number of barges to be constructed from 65 to 33, the United States Maritime Commission last week announced revision of its concrete-oil-barge program. These barges are all non-self-propelled.

In taking its action, the commission pointed out that when the original contracts were awarded during the summer of 1941, the East Coast was faced with a severe oil shortage. Also at that time, it was impossible to divert steel and propulsion equipment for the construction of more than the scheduled number of new tankers without causing serious delay in the rest of the emergency ship construction program. The commission, therefore, reluctantly authorized a concrete barge program as insurance against a shortage of tanker tonnage that would seriously hamper the war effort.

Today, however, additional steel has been made available along with sufficient propulsion machinery to make the construction of tankers advisable instead of concrete barges. Furthermore, the commission's decision to convert 102 Liberty ships into tankers has resulted in assisting the general situation.

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Sketches of Plant Operators

JAMES HARROP, the first chemical engineer in the Humble Oil & Refining Co.'s engineering department, has been promoted to superintendent of the company's largest manufacturing operation at Baytown, Tex.

He is a native of Taunton, Mass.,

where he finished high school prior to entering Massachusetts Institute of Technology. After receiving his bachelor's and master's degrees in chemical engineering he was retained at M.I.T. as an instructor in industrial chemical engineering and plant design until September of 1922 when he went to Baytown as the first chemical engineer in the engineering department.

Later he served as an assistant to the superintendent and second assistant superintendent before going to the company's Houston office as assistant to the manager of refineries. When the Houston engineering department was organized he became assistant chief engineer.

Returning to Baytown, he became assistant refinery engineer and later head of the technical-service division for several years.

Mr. Harrop next moved up to assistant superintendent in charge of coordination, pumping and gaging, and docks.

For the past few years he served as assistant general superintendent of the Baytown refinery under Gordon L. Farned, who was made plants manager for the Humble company at the time Mr. Harrop was promoted.

First Crude Reaches Eastern Terminal of Big-Inch Line

Several refineries along the Atlantic seaboard will be receiving crude oil from the 24-in. line before the end of the month. The first crude oil from East Texas arrived at Phoenixville, Pa., the eastern terminal of the line, August 13, and from that point the crude will be delivered to lines connecting to refineries. At least four refineries in the area have been receiving crude oil from smaller lines connected to eastern and southwestern fields.

The schedule of refinery deliveries which will average more than 300,000 bbl. daily when the line is operating at capacity has not been announced The refineries in the Philadelphia, Bayonne and New York areas to which crude oil could be delivered by pipe line or combination are:

Company and plant location—	Daily capacity (bbl.)
Atlantic Refining Co., Philadelphia	95 000
Gulf Oil Corp., Philadelphia	58,000
Sinclair Refining Co. Marcus Hook, Pa.	55,000
Sun Oil Co., Marcus Hook, Pa.	90,000
Socony-Vacuum Oil Co., Inc., Long Island City, N. J.	19,000
Cities Service Oil Co., Camden, N. J.	20,000
Cities Service Oil Co., Linden, N. J.	12,000
Standard of New Jersey, Bayonne 7, Linden, N. J.	124,000
Tide Water Associated Oil Co., Bayonne, N. J.	57,000
Total	530,000

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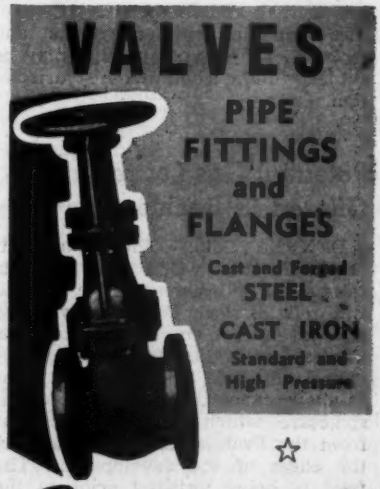

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Natural Gas

FPC Sets Hearing on Kansas-Nebraska Co. Application

WASHINGTON, D. C.—The Federal Power Commission announced August 13 its order setting hearing October 6, 1943, in the U. S. District Court, Topeka, Kans., on proceedings instituted by the commission to determine (1) whether a pending application filed by Kansas-Nebraska Natural Gas Co., Inc., Phillipsburg, Kans., for a certificate of public convenience and necessity to construct and operate a natural-gas pipe line in Kansas, need be amended to include existing facilities jointly operated by Kansas-Nebraska and Tri-County Gas Co. (of Kansas), (2) whether Fin-Ker Oil & Gas Production Co., Holcomb, Kans., Tri-County Gas Co., Holcomb, Kans., and Kansas Natural Gas, Inc., Hays, Kans., are natural-gas companies within the meaning of the Natural Gas Act, and (3) the operating, contractual, and financial relations of the companies with each other, and with any other company that may be subject to the commission's jurisdiction.

Potential Gas Leases Offered in Rockies

DENVER, Colo.—The Department of the Interior will offer six tracts comprising 891 acres in the Buffalo Basin field, Park County, Wyoming, at Cheyenne, Wyo., on September 9. The sale will be at 10 a.m., the Cheyenne land office. The tracts are within the area of the known geological structure which now produces gas from the Frontier sands, but around the edges of the development. The field is being unitized prior to the testing of the deeper horizons to the Tensleep.

The district land office at Salt Lake City will receive bids for leases on eight parcels of varying size in the Cisco Dome gas field, Grand County, Utah, on August 21. The land is located in Sections 20 and 21s-22e, in an old gas field operated by the Utah Oil Refining Co. and by the Crystal Carbon Co. The wells subsequently were abandoned with one exception. The U. S. Geoolgical Survey made periodical tests of this well and found that pressure gradually was being built up again. Successful bidders must put their holdings into a unit agreement.

Union Gas System to Fight Service Discontinuance

KANSAS CITY, Mo.—Application of Cities Service Gas Co. to cancel its rate schedule for sale of natural gas to Union Gas System, Inc., Independence, Kans., and to discontinue service August 22, will be reviewed by the Federal Power Commission here August 23. The Union company has filed a protest against the proposed discontinuance of service and will be represented at the FPC hearing.

Union Gas System has pending before FPC a complaint alleging that Cities Service refused to deliver gas to Union's facilities near Olathe, Kans., as provided by Rate Schedule 42.

Cities Service Asks to Expand Gas Facilities

WASHINGTON, D. C.—The Federal Power Commission has set hearing for August 25 at Kansas City, Mo., on an application filed by Cities Service Gas Co. for a certificate of public convenience and necessity to construct and operate additional facilities in Oklahoma, Kansas and Missouri.

The Cities Service application for authority to build additional facilities covers a 12-in. loop line, 35.25 miles long, in Oklahoma; a 20-in. line, 11.25 miles long, to loop an existing line in Kansas; the reconditioning of 16 miles of 16-in. line in Kansas, and the installation of 340 additional horsepower at the Saginaw compressor station in Missouri.

The order provides that the trial examiner designated to preside at the August 25 hearing may, in his discretion, consolidate the proceedings, for the purpose of the hearing only, with the proceedings (Dockets G-487 and G-488) in which Cities Service Gas Co. and others and Cities Service Transportation & Chemical Co. seek authority to construct and operate a 26-in. natural-gas line extending approximately 231 miles from the Hugoton gas field in Texas County, Oklahoma, to Cities Service Gas Co.'s Blackwell compressor station in Kay County, Oklahoma, and for related facilities to be constructed to handle gas to be delivered through the new line. Hearing on the proposed 231-mile line had been previously set for August 18 in Kansas City.

Natural Gasoline

Production Holding Approximately Constant

WASHINGTON, D. C.—Daily average production of natural gasoline and allied products held approximately constant in June, averaging 235,000 bbl., which was at the same rate reported for May.

Average output for the first 6 months this year was reported by the Bureau of Mines at 236,000 bbl. daily compared with 225,000 bbl. a day for the same period a year ago.

Material gains in production during June in Illinois, Oklahoma, inland Louisiana and California were offset by declines in the eastern states, East Texas and the Texas Panhandle districts.

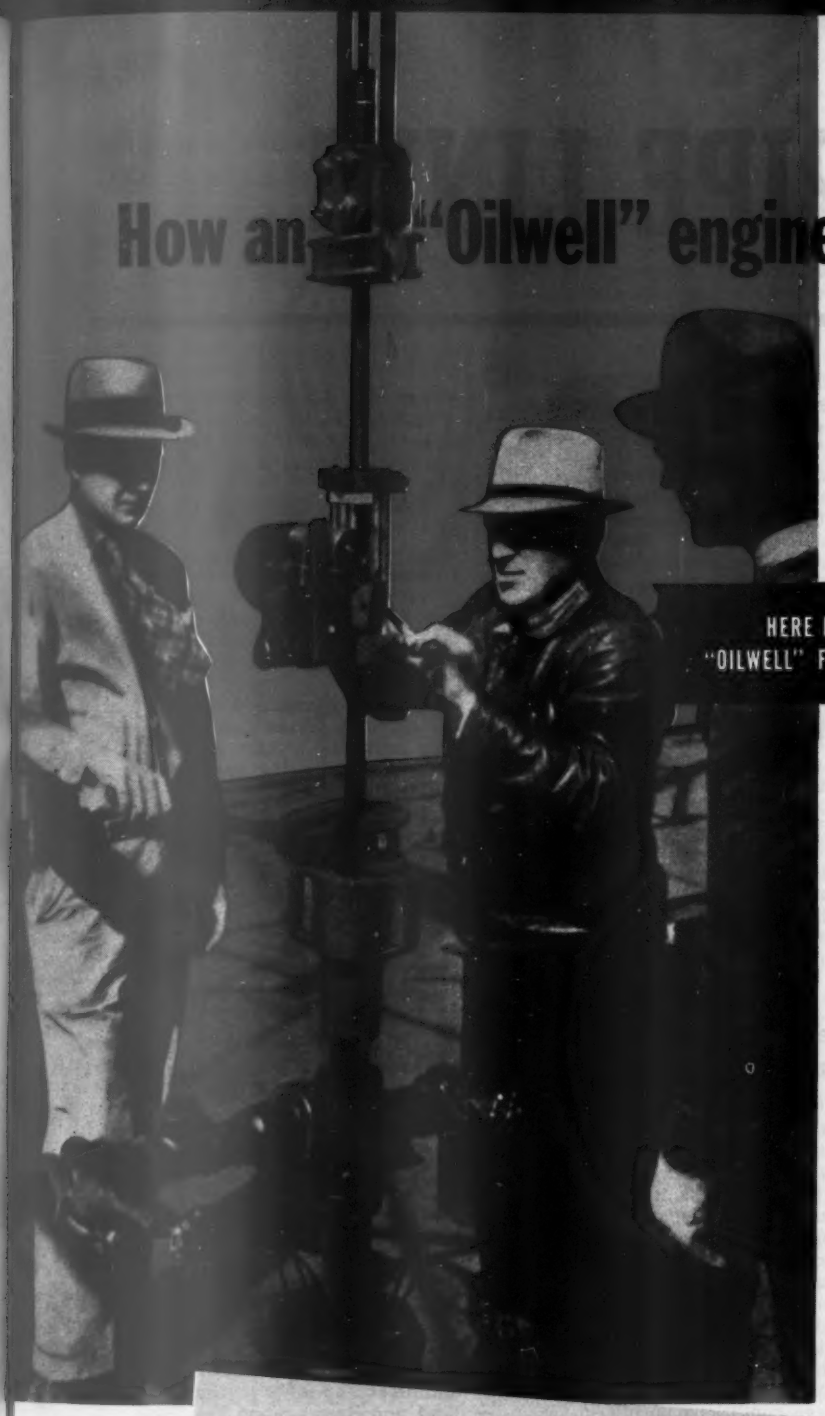
A decline was registered in the production of liquefied gases.

PRODUCTION
(Thousands of gallons)

	June 1943	May 1943
Western New York	1	1
Western Pennsylvania	927	1,205
West Virginia	6,177	7,795
Ohio	440	502
Illinois	14,510	14,521
Kentucky	2,825	3,380
Michigan	119	128
Kansas	6,135	6,586
Oklahoma	34,053	34,606
Texas	134,076	139,894
Arkansas	5,008	4,909
Louisiana	24,287	23,971
New Mexico	6,745	6,604
Colorado	15	12
Montana	359	351
Wyoming	2,509	2,692
California	57,998	59,023
Total	296,184	306,180
Daily average	9,873	9,877
Total (thou. of bbl.)	7,052	7,290
Daily average	235	235

PRODUCTION OF LIGHT PRODUCTS
(Thousands of gallons)

	June 1943	May 1943
Stocks—first of month	246,456	244,272
Production:		
Natural gasoline	164,892	168,966
Cycle products	51,870	53,634
Liquefied petroleum gases:		
Isobutane at natural gasoline and cycle plants	13,230	12,600
Other L.P.G. at natural gasoline and cycle plants	66,192	70,980
Liquefied refinery gas at refineries	11,886	17,136
Benzol	8,400	8,400
Total supply	562,926	575,988



How an "Oilwell" engineer found the answer to a pumping problem

HERE IS A TYPICAL EXAMPLE OF HOW "OILWELL" FIELD ENGINEERING SERVICE WORKS

FREQUENT rod breaks in a number of 5400-ft. wells were causing an Oklahoma producer no end of trouble, interrupting production and necessitating costly fishing jobs. There was no indication that the ¾-inch sucker rods were overloaded; but the fluid level was known to be low, and there was evidence of some bottom-hole difficulty.

At the request of the manager of a nearby "Oilwell" store, an "Oilwell" subsurface equipment engineer called on the producer and made a careful analysis of the pumping characteristics of the wells. Weighing the wells with a dynamometer, which accurately records pumping conditions not perceptible to eye or touch, indicated that the pumps were pounding fluid, setting up a vibration which caused the premature rod failures.

Discussing his analysis of the problem with the producer, the "Oilwell" engineer showed how the trouble could be remedied by changes in operation. The producer followed the engineer's recommendations with the result that sucker rod failures have been avoided with no decrease in production.

Field engineering service is just one of the *plus* values you get under "Oilwell's" 10-Point Supply Service. Study the others. It will pay you to deal with "Oilwell"—where your business is appreciated.

WHAT YOU GET FROM "OILWELL" 10-POINT SUPPLY SERVICE

1. Dependable source of supply
2. World-wide distribution
3. Adequate warehousing to protect material and to speed deliveries
4. Convenient store locations
5. Field engineering assistance
6. Product design and metallurgy keyed to your needs
7. Extensive manufacturing and testing facilities
8. Highest grade supplies for oil and gas field needs
9. Prompt and understanding credit service
10. 81 years of practical experience.

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DIVISION OFFICES—COLUMBUS, OHIO
DALLAS, TEXAS—LOS ANGELES, CALIF.

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DULL IN 3 DAYS
STILL SHARP AFTER 30 DAYS
STOODY TUBE BORIUM* KEEPS DITCHER TEETH SHARP ...ELIMINATES FREQUENT SHUT-DOWNS FOR TOOTH CHANGES...CUTS REPLACEMENT COSTS UP TO 75%

The two ditcher teeth pictured above were used on the same machine and operated under identical conditions.
The unprotected tooth at the top had to be sharpened every three days and was too short for further service after six sharpenings.
But the Borium-protected tooth at the bottom operated for 40 days and wore only ½". It was simply resharpened in the forge, retipped with Tube Borium, and put back on the ditcher for another 40 days' service.
Before the tooth was finally worn out, it had operated a total of 120 days!
Tube Borium makes such savings possible because the deposits represent the ultimate in wear resistance and the ability to cut hard earth formations.

*Stoody Tube Borium is supplied in rods of 5/32", 3/16", ¼" and 5/16" diameters and is available for either oxyacetylene or D.C. electric application. Prices and specifications are yours for the asking.

These tungsten carbide particles do not melt when tube is applied but are held in suspension in a mild steel matrix forming a deposit resembling coarse sandpaper.

Send for free booklet on TUBE BORIUM, showing sizes and styles of rods and recommended methods of application.

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PIPE LINES

Shell Reconditions Section Of East Texas Line

Near Livingston, Tex., Shell Pipe Line Corp. is reconditioning 85 miles of 10-in. pipe on the company's Kilgore-Houston, Tex., line. In recent months the line has been reversed to feed the War Emergency Pipelines, Inc., 24-in. line.

Work is being done by the field plant method in such a way that the line continues to operate during the period when reconditioning is in progress. Repair work is carried on in 20-mile sections which are bypassed by a line laid alongside the ditch through which oil is pumped. Pipe is removed to a plant for spot welding, coating and wrapping before it is installed again in the line. This is the first time that Shell Pipe Line Corp. has used this particular method for reconditioning. The operation has been contracted by O. R. Smith.

Great Lakes Line Will Handle Heavier Products

Movement of petroleum products heavier than gasoline through Great Lakes Pipe Line Co.'s system may be started in the near future in order to utilize full capacity of the system. Reduction of the gasoline coupon value in the Middle West, it was anticipated by the pipe-line company's management, would make available an undetermined capacity for movement of light fuel oil, kerosene and tractor fuel.

Revamped operation of the line probably will be started as soon as storage conditions permit.

Distillate has been carried by Great Lakes before, when seasonal conditions made it possible for the system, primarily a gasoline carrier, to do so.

Great Lakes' policy under the changed conditions will depend entirely on considerations of time and the operations of its refiner customers. Most or all of these are heavily concerned with gasoline. But if space and supplies are available, the switch to the other products will be made. It is assumed, however, that the facilities of the system will continue to be occupied through August and September entirely with the two grades of gasoline now carried.

Great Lakes has been operating at a high rate recently. In the first half of 1943 it is understood to have moved some 11,000,000 bbl. of products, an increase of 25 per cent from the first half of 1942.

In switching to heavier products in part, the system undoubtedly would experience a noticeable decline in volume, because of need to revamp operations, higher line resistance of heavier products, slugging of products, etc. Some estimates are that its loss in capacity may be as much as 20 per cent.

Although planning for these possible changes, Great Lakes is continuing to handle a large exclusive gasoline business. Its operations currently include large-scale service to tank trucks. It is now estimated to be filling some 700 of these trucks daily.

Magnolia Waits for Midland-Corsicana Permit

MIDLAND, Tex. — Magnolia Pipe Line Co. is reported to be preparing plans for work in West Texas which could be done in advance of the arrival of new pipe for the construction of the proposed outlet for West Texas for which federal approval is being awaited.

The proposed line of Magnolia would be a 12-in. line paralleling the company's present crude-oil line from Midland to Corsicana, Tex., where deliveries would be made through connections to War Emergency Pipelines, Inc.'s terminal of the 24-in. crude line to the East Coast.

Plans are believed to call for the installation of reciprocating pumping equipment at three stations; at Midland and Sweetwater, Tex., this will be driven by electric motors; at Leon, Tex., diesel power will be used. With these three stations a capacity of 42,000 bbl. daily can be attained. Later on, by the installation of additional stations bringing the total up to six stations, a capacity of 58,000 to 60,000 bbl. daily will be possible.

Prospects appear to be favorable for the project being started some time this year. Before the main line is begun, it is said that looping 50 miles of line of the present Magnolia system with second-hand pipe north of Midland as well as other work involving the use of used material may be begun soon after the whole project has federal approval.

First Part of Canadian "Little Inch" in Service

The first part of the "little inch" pipe line which will eventually move crude oil from Fort Norman, Northwest Territories, Canada, to Whitehorse, Alaska, is now in service, supplying the camp at Canol. Diesel oil from the small refinery operated at Fort Norman by Imperial Oils, Ltd., is moved through the first part of the line for use in diesel ditchers and other construction equipment.

Although the distance from the wells to Whitehorse is only some 400 miles as the crow flies, the pipe will stretch some 600 miles because of the devious route it must follow to get through the high mountains at the lowest possible altitude.

Pumping stations are being established every 30 or 40 miles.

From Whitehorse another crew is laying pipe toward the east, and sometime late this year the two ends of the pipe will meet.

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Oil & Gas Building HOUSTON, TEXAS

Cities Service Connects Sour Lake With Lake Charles

A 67-mile 12-in. line has been under construction for Cities Service Oil Co. interests for moving crude from Sour Lake, Tex., to the company's refinery at Lake Charles, La. There has been some discussion as to whether this will be operated by the Lake Charles refinery organization or by Arkansas Fuel Co.

Cities Service Has Awarded Hugoton-Blackwell Contract

Cities Service Transportation & Chemical Co. has awarded a contract to Bechtel-Dempsey-Price for construction of the 250-mile 24-in. line from Hugoton, Kans., to Blackwell, Okla. Gathering-line work starting in September will be contracted soon.

Work on the main line will start October 1. There will be three mainline gangs and two river gangs.

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Permanent
Pipe Protection
as demonstrated by SOMASTIC on lines from ½" to 24" in diameter makes possible substantial savings of war-scarce steel.
When coated with SOMASTIC the wall thickness of steel pipe may be reduced with safety to the minimum permitted by operating pressures. Another means of conservation is supplied by Industrial Engineering Co.'s used-pipe reconditioning service . . . complete, thorough.
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Northern Natural Prepares For 24-In. Loop

Northern Natural Gas Co. is making preparations for building a 25-mile 24-in. loop in the vicinity of Ellenwood, Kans.

Humble Loops Line From Webster to Baytown

A 7-mile 8-in. loop is being laid by Sharman & Allen for Humble Pipe Line Co. between the Webster station and the Humble refinery at Baytown, Tex. This contractor is completing the laying of the Baytown-Beaumont, Tex., 16-in. feeder line for War Emergency Pipelines, Inc.

R. C. Sanders Manages Florida Pipe Line

R. C. Sanders is manager of Florida Emergency Pipeline Co., a DPC property operated under the supervision of Southeastern Pipe Line Co. Mr. Sanders left a position as supervisor aid to Oscar Wolfe, chief engineer, and Oscar R. Burden, general superintendent, War Emergency Pipelines, Inc., to assume his present responsibilities. Before the WEP project he was engineer with Gulf Refining Co., pipe-line division.

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An organization operating wherever Oil, Gas and Water Lines are constructed.
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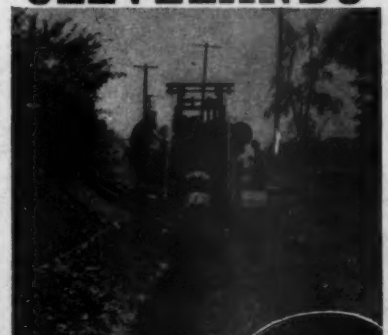
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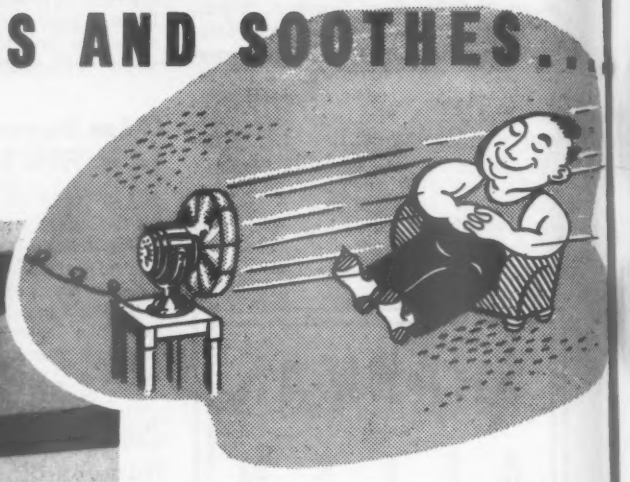

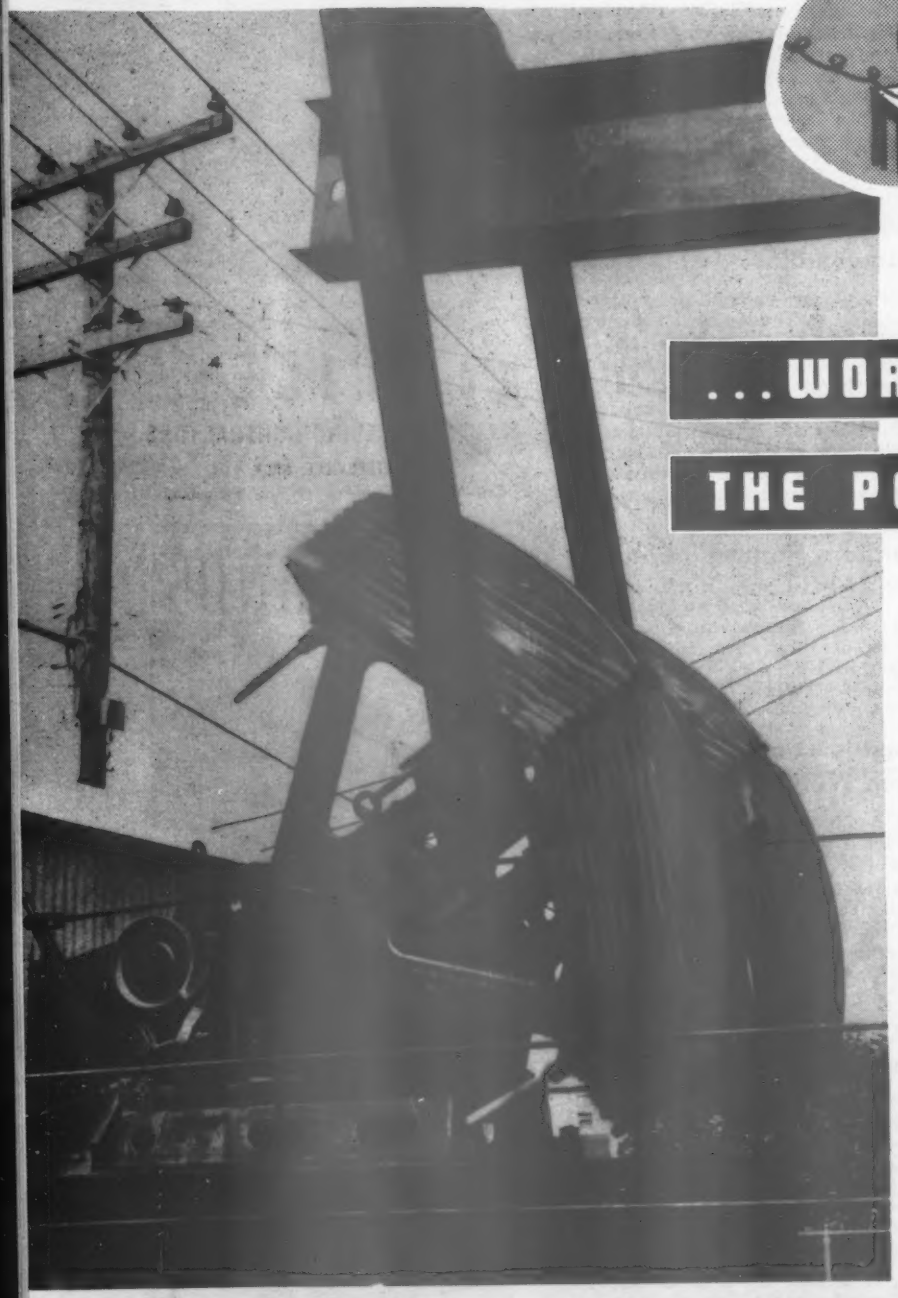

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Exploration and Drilling

Week's Highlights

NOT in any way discounting the importance of price and the availability of manpower and equipment, producers in the Rocky Mountain area have shown again that the presence of large quantities of oil is also required if drilling is to become active. The sale of leases in the Elk Basin field at prices ranging up to $5,800 an acre is an indication that, even under present unfavorable conditions, operators will go after oil if they feel confident that they can find it.

Interest in the leases offered was, of course, increased by a well drilled practically on the apex of the structure which proved that the Tensleep sand at Elk Basin does not have a large free gas cap. Oil has been found in this pay over an area of some 6 sq. miles and at varying levels from near the crest of the structure to 1,500 ft. below the crest. A well 1/4 mile north of this latest completion will show whether any gas cap at all occurs in the field.

Montana has been reporting a decline in production during recent months, arising more from difficulties in arranging spacing patterns than from dwindling reserves. The prolific Elk Basin production which extends well into the state will undoubtedly reverse this trend, although this field is in the southern part of the state rather than along the northern boundary where the heavy demand exists.

The reported finding of oil in the Amsden limestone, which lies below the Tensleep is of interest. This information has always been considered a potential pay in the Rocky Mountain area but has not yielded promising results to date. This new discovery, almost in the center of Montana, lies about 40 miles from the old Cat Creek field which has been tested to the Madison which lies below. Other fields producing from the Madison which showed nothing in the Amsden lie 200 miles to the northwest and 120 miles to the south. If Amsden potentialities are limited to this area, there is still a lot of room in which to search for them.

In the southern part of the country, the Tuscaloosa continues to arouse much interest. First gas-distillate production was reported from this formation last year in extreme eastern Louisiana, then some oil was found across the river in western Mississippi. More recently, good production was reported on test from a rank wildcat near the Alabama line but this seems to be less promising than at first thought. Now another wildcat in Tensas Parish, Louisiana, has finally proved that this formation is capable of yielding good oil production. The Tuscaloosa, which is of the same age as the Woodbine in the East Texas basin will probably now be actively prospected around the whole of the Mississippi embayment.

CALIFORNIA: Several wells are heading for the submerged Jones zone at Huntington Beach, regardless of the high royalties payable to the state. The sand is comparatively shallow and penetrations of 600 to 900 ft. are reported (p. 92).

MICHIGAN: A Clare County discovery reports flows up to 300 bbl. an hour from the Dundee (p. 97).

NORTH TEXAS: New Ellenburger production has been found west of the Consolidated pool in Wilbarger County and south of Wichita Falls (p. 96).

WEST TEXAS: A new pool has been opened west of the Fullerton area, Andrews County (p. 100).

LOUISIANA GULF COAST: Tests are starting in the Reddell area wildcat, which, if successful will bring in the deepest Wilcox production in Louisiana (p. 93).

COMPLETIONS IN ALL FIELDS . . .

(Week ended August 14, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna., W. Va.	51	16	5	72	142,895	2,071	2,152
Ohio	0	10	7	17	41,565	524	654
Indiana	1	0	1	2	5,235	137	202
Kentucky	5	0	5	10	23,041	233	132
Illinois	23	0	24	47	118,081	1,067	1,008
Michigan	11	3	8	22	56,738	340	427
Kansas	14	0	17	31	113,570	984	938
Nebraska	1	0	1	2	6,000	20	. 24
Missouri-Iowa	0	0	0	0	0	9	10
Oklahoma	19	3	11	33	103,946	698	768
Texas:							
North Central Texas	17	0	8	25	85,162	833	708
West Texas	14	0	3	17	72,771	508	934
Texas Panhandle	2	1	3	6	16,324	113	246
Eastern Texas	6	0	7	13	73,934	174	253
Texas Gulf Coast	6	0	6	12	88,548	269	481
Southwest Texas	5	0	13	18	87,277	553	724
Total Texas	50	1	40	91	426,016	2,450	3,346
North Louisiana	4	1	1	6	18,848	194	289
Louisiana Gulf Coast	4	1	3	8	49,431	227	321
Total Louisiana	8	2	4	14	68,279	421	610
Arkansas	2	0	4	6	24,483	148	101
Mississippi and Southeast	0	0	0	0	0	55	33
Montana	5	3	2	10	20,874	127	112
Wyoming	1	0	2	3	9,876	74	61
Colorado, Utah	0	0	2	2	2,500	18	11
New Mexico	0	0	2	2	10,126	128	151
California	20	1	7	28	82,204	784	471
Total United States	211	39	142	382	1,255,431	10,288	11,211
Total previous week	231	31	153	415			
Week ending Aug. 15, 1942	152	39	91	282			

ROCKY MOUNTAIN

High Bids Recorded For Elk Basin Leases

DENVER, Colo.—An all-time high record for bids on oil and gas leases on federal land in the Rocky Mountain area was established at Billings, Mont., on August 12, when the United States land office offered three tracts in the Elk Basin field comprising 262.5 acres. The aggregate of high bids was $1,407,500 or an average of $5,372 an acre. The successful bidders were the Phillips Petroleum Co. for Parcel 2, comprising 45 acres in the E½ SE 19-58n-99w, the bid being $3,600 an acre, or a total of $162,000; Stanolind Oil & Gas Co. for Parcel 3, comprising 137½ acres along the eastern side of 30-58-99, due north of the Tensleep discovery well, the bid being $5,800 an acre or $797,500; and Stanolind Oil & Gas Co. for Parcel 5, comprising 80 acres along the east side of SE 25-58-100, west of the discovery, the bid being $5,600 an acre, or $448,000. Six parcels had been advertised but Nos. 1, 4 and 6 were withdrawn before the sale took place, a question having arisen as to the ability of the Government to deliver a clear title.

Practically all the major companies in the area were represented at the sale as were a number of independents, but the bidders were comparatively few and as prices rose, dropped down to the two. The Continental Oil Co. dropped out of the bidding when the offers went above $5,000. The Ohio Oil Co., one of the principal operators in the field, submitted no bids. Prior to the sale some oil men ventured the suggestion that bids might reach $2,000 an acre. Then one independent stated that he was going to start it off with a bid of $2,500 an acre on one of the tracts. This talk caused a considerable lifting of eyebrows, but what actually happened at the sale was far above what was expected and a considerable surprise.

Top well at Elk Basin.—The structurally highest well so far drilled to the Tensleep in the Elk Basin field was completed the past week in the Ohio Oil Co. 25 Elk OPC-3, NE NE SE 24-58-100, which flowed 110 bbl. an hour at 4,172 ft., total depth. Most of the Tensleep wells completed in the field since the bringing in of the discovery last December have been out on the flanks, and ranged from 200 to 1,500 ft. below the apex of the structure. The Garland dome, 20 miles to the southeast, has a gas cap in the Tensleep, covering approximately 1,700 acres on the top of the structure, and the possibility of a similar condition at Elk Basin was not overlooked. The Ohio well, however, indicates the absence of any large gas reservoir at the top. This well is on the next to the highest contour and has an elevation of 4,548 ft. It had the top of the Tensleep at 3,976 ft. and 6⅝-in. casing was cemented at 4,120 ft. The Tensleep was found 572 ft. above sea level, 114 ft. higher than the discovery, which compares with 862 ft. below sea level in the Yale 1 Watson, out of the southwest flank, a difference of 1,434 ft. Continental is drilling its 101 E-T Elk 2 just 1,320 ft. north of the Ohio completion and is at the very apex of the dome as shown on the U.S.G.S. map.

Moffat County sells lease—Rumors of the discovery of structural conditions in the Maybell district in Moffat County, Northwest Colorado, 30 miles west of Craig, have been current for several weeks, and has resulted in some leasing. None of the old geological maps show any structure there, but the play indicates that something to warrant the interest has been found. Officials of Moffat County had been approached by parties seeking leases on land owned by the county, and it was decided to offer the leases at auction. Oil and gas rights on 480 acres in 35-7n-96w and 2 and 9-6n-96w, were bid in by W. J. Radigan, said to be acting for the Stanolind Oil & Gas Co., who offered a high bid of $120 for the lease. The district is 2 miles west of Maybell and north of the Dry Lakes district where several wildcats have been drilled in the past few years.

Show for discovery at Gage.—Northern Ordnance, Inc. 1 State-Morris, C SW SW 15-9n-26e, Musselshell County, central Montana, is reported to have produced at the rate of 13 bbl. an hour from the Amsden sand at 5,980-6,060 ft. on a drill-stem test. Drilling continued and at last report it was coring at 6,239 ft., with additional showings below the point at which the test was made. This is one of a series of wildcats being drilled in Montana by Northern Ordnance on blocks assembled by the Carter Oil Co. Two or three of these tests have been abandoned, but 10 are now in course of drilling in Toole, Teton, Pondera and Rosebud counties. The Gage structure is just north of the town of that name on the Chicago, Milwaukee & St. Paul Railroad, and is near the center of the state. The nearest production is in the old Devil's Basin field, an early discovery, but which produced only a few thousand barrels of oil before being abandoned.

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 14 crude oils	Aug. PAW quota all oils*	Aug. 7 crude oil
Arkansas	76,235	75,500	76,855
California	788,250	830,000	783,500
Colorado	6,530	7,000	6,590
Eastern fields	97,950	111,500	106,300
Illinois	227,400	222,800	218,800
Indiana	14,750	14,000	13,900
Kansas	306,200	300,000	277,700
Louisiana	352,280	356,300	352,120
North Louisiana	83,780	.....	83,620
Louisiana Gulf Coast	268,500	.....	268,500
Michigan	60,200	60,100	55,400
Mississippi	54,365	50,000	48,395
Montana	19,485	23,300	24,350
Nebraska	2,000	2,100	2,200
New Mexico	105,000	110,000	103,500
Oklahoma	331,450	347,000	329,900
Texas	1,710,800	1,817,000	1,702,750
East Texas	371,000	.....	371,000
West Texas	258,400	.....	258,400
North Central Texas	129,950	.....	129,800
East Central Texas	140,400	.....	140,400
Texas Panhandle	98,000	.....	90,300
Texas Gulf Coast	624,250	.....	624,250
Southwest Texas	88,600	.....	88,600
Wyoming	105,890	98,000	105,265
Total United States	4,258,585	4,424,600	4,208,025

Total production Jan. 1-Aug. 14, 1943 ..... 895,690,970 bbl.
Same period last year ..... 852,927,335 bbl.
*Includes 245,000 bbl. daily average of natural gasoline and associated products.

NORTH LOUISIANA

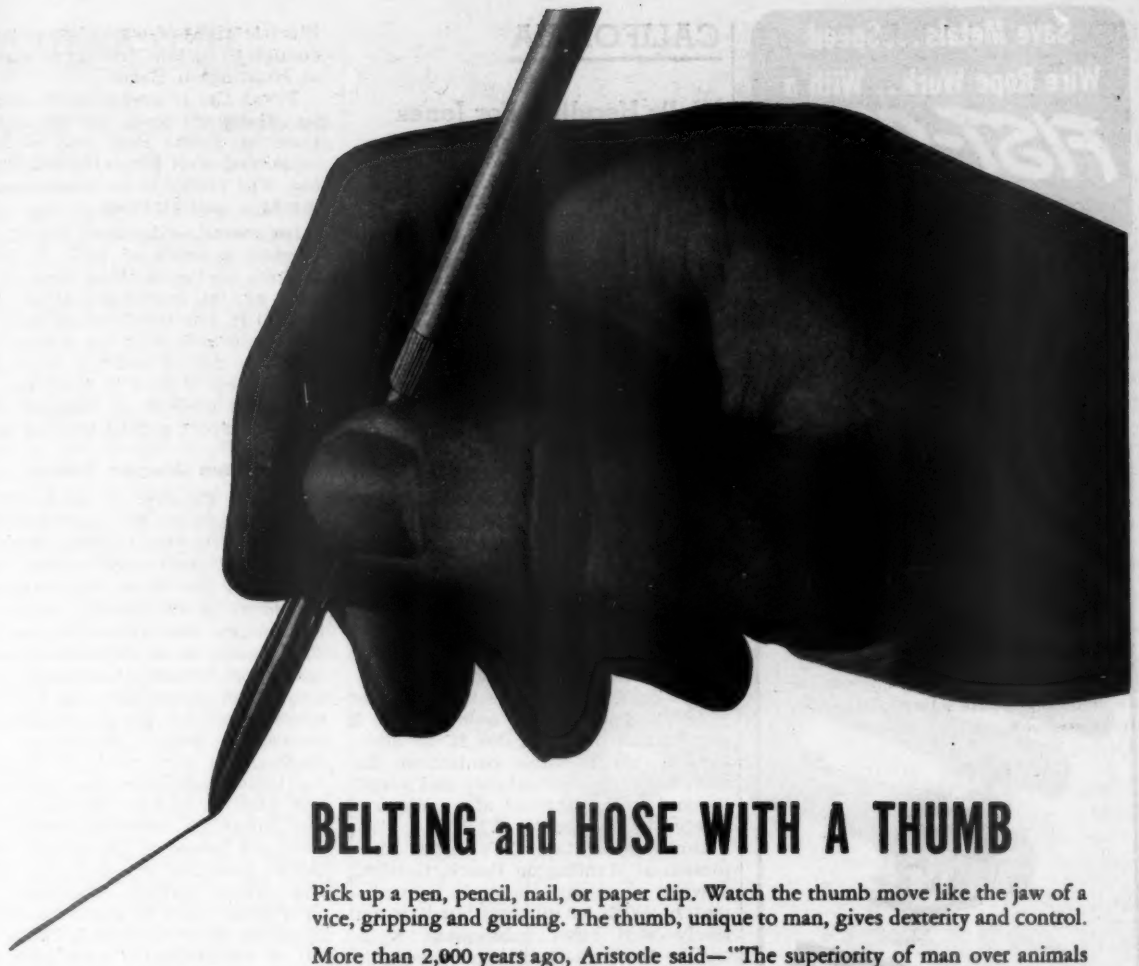
Tuscaloosa Sand and Deep Homer Discoveries Complete

SHREVEPORT, La.—Carter Oil Co. 1 R. D. Shelley, SW NE 19-11n-10e, Tensas Parish, is an important discovery in the lower Tuscaloosa, a little-explored formation for this area. The well opens a relatively large area for future prospecting of that formation over most of Mississippi and a large part of Louisiana.

Massive sand was found from 8,399-8,434 ft., with total depth at 8,444 ft. After running casing to bottom, perforations were made at 8,399-8,410 ft. and the well established a potential of 388 bbl. of 37.5-gravity oil, flowing through 5/32-in. tubing choke. Tubing pressure was 1,500 lb. and casing pressure was 1,600 lb.

The well lies approximately 13 miles north of the Lake St. John field where two wells have been drilled to the same horizon and found it productive of gas distillate. These wells were subsequently plugged back for production at a shallower depth due to a lack of outlet for the distillate. As regards the Massive sand of the lower Tuscaloosa and oil production therefrom, there is only one other well that is actively pro-

(Continued on Page 106)



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Saves accidents — can't be put on wrong; doesn't weaken rope; greater holding power.

Saves metals—25% fewer clips do the job better; no crushed rope ends; flush nuts—no battered threads.

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Greater holding power with 25% less clips!

"Finger-Pinch". U-bolt clips unavoidably crimp, distort and bow wire rope, causing reverse strains when load is applied.

"Fist-Grip". Fewer Safety Clips hold rope straight in smooth, vise-like grip, with no protruding threads to get battered in use. Clips and rope can always be used on the next job.

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CALIFORNIA

Wells Heading For Jones Sand at Huntington Beach

LOS ANGELES, Calif.—Huntington Beach in Orange County will have several wells headed down to the submerged Jones sand which was proved quite prolific a few months or so ago and again last week when Huntington State Co. finished an excellent flowing well. Three wells have already started redrilling jobs which will have the Jones sand as their objective and plans are under consideration for greatly increased drilling by Huntington State Co. and Southwest Exploration Co. Huntington State Co. pays the State of California a royalty of 45 per cent on the basis of 200 bbl. per day and if production increases to 500 bbl. daily the royalty jumps up to 68 per cent.

Important zone. — The Jones sand now being exploited by Southwest Exploration Co. and Huntington State Co. is an excellent zone and by directional drilling from locations on the uplands operators are able to take a penetration of about 600 ft. In addition to this favorable pentration, the sand has high permeability and porosity and is encountered at a comparatively shallow depth, 3,275 ft.

Huntington State Co.'s initial completion at Huntington Beach, finished a week or so ago, took in approximately 900 ft. of oil sand but it is not likely that other subsequent wells will be able to secure such a favorable penetration. To date, four wells have been completed in the Jones sand, three by Southwest Exploration Co. and one by Huntington State Co. and it is estimated that 50 additional wells may be possible from the Jones sand before the edge of the pay is reached.

Orange County. — The California State Lands Commission will soon entertain bids for development of the tidelands off Newport Beach as the state's attorney general has ruled that the commission may call for bids if wells already drilled on the uplands are producing from a zone believed to be productive beneath the water. This action was taken in order to permit leasing of the Newport tidelands to responsible operators but not all operators will be able to bid as surface locations must be available on the uplands from which to drill into the tideland accumulation by directional drilling. An ordinance of Newport provides that any and all drilling must be located north of the Pacific Electric Railway tracks. A similar situation exists at Newport as was found at Huntington Beach where the Pacific Electric Railway's tracks parallel the tide line and in close proximity to the beach. If Standard decides to drill at Newport it will have first call to the Pacific Electric right-of-way if that is wide enough to sustain drilling as was done at Huntington Beach.

Texas Co. is preparing to abandon its discovery well on the Spencer lease at Buena Park and when the remaining well goes off production it, too, will probably be abandoned and the area quit claimed.

Inglewood.—Standard Oil Co. has reached a depth of 8,550 ft. in 1-36 Vickers in the Sentous zone of Miocene age at Inglewood although the last 50 ft. has consisted of gray sand and shale indicating the company has probably drilled entirely through the zone. Even if this is true the company has opened up enough of the zone to expect a good flowing well.

San Joaquin Valley

Fresno County. — Seaboard Oil Corp., Union Oil Co. and Tide Water Associated Oil Co., having discovered a new oil field west of the Raisin City field last week, will receive an allotment of 105,000 bbl. as a bonus for having discovered a new field. This bonus is in accordance with a resolution recently approved by the production committee for District 5 which provides for a progressively increasing bonus depending upon depth. This joint well of the above mentioned companies was finished below 6,000 ft. and in accordance with the bonus for new discoveries will receive a bonus of 105,000 bbl. which can be produced at a daily rate of 450 bbl. under certain conditions. The daily rate, which is above the amount generally given to 6,000-ft. fields, cannot be maintained if such production rate would result in excessive gas waste. Providing the well can be produced at the 450-bbl. rate it could produce at this rate for a total of 233 days or until an offset well has been completed. An offset well is defined by the production committee for District 5 as "any well which shall be completed as a commercial producer in the productive zone discovered by a certified well and shall be located at or within 1,320 ft. from such certified well and shall be located upon lands, the fee title to which is vested in a person other than the owner of the fee title to the lands upon which such certified well is situated." In addition to the above stipulations, the order prescribes that the 450 bbl. daily rate must be the most efficient rate of production and conform with other restrictions. The first offset well which might affect the production rate of the discovery well is 1 Taylor which will be drilled immediately by Universal Consolidated Oil Co. to the south. Shell and Signal Oil & Gas Co. also have close-in acreage and can be expected to start development work in the near future.

Kern County. — Despite persistent reports, Continental Oil Co. has only

(Continued on Page 102)

LOUISIANA GULF

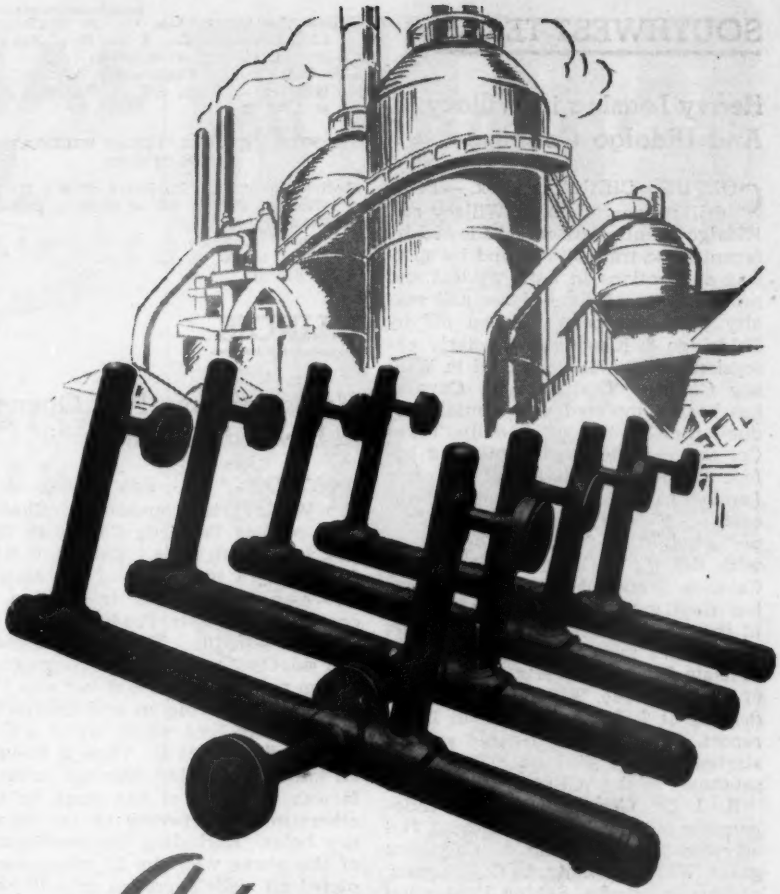
Schedule Testing Operations For Reddell Test

NEW ORLEANS, La.—Interest of oil observers in coastal Louisiana was held largely this week by Danciger Oil & Refining Co.'s Wilcox sand wildcat test in Reddell area of Evangeline Parish, where testing operations were scheduled. This well, 1 Hattie Haas, was drilled to total depth of 12,206 ft., where 6-in. casing was set. The Wilcox was topped at 10,490 ft., and shows of oil, gas and distillate were reported between 10,795 and 12,115 ft. The first of a series of tests is expected to be made near the latter level. If the 1 Haas opens a new field, and many oil men say the chances are favorable, it will record the deepest Wilcox production in Louisiana. Significant of the opinion held by prospectors is the fact that Continental Oil Co. and Humble Oil & Refining Co. are rigging up for a joint test, 3 Pardee Lumber Co., in 20-4s-1w, a mile west of the 1 Haas. Prices of leases and royalties in this area have risen, and there has been a marked increase in trading. Keen interest is manifested in a well which Texas Co. is drilling in 35-3s-1w, on the southwest flank of the Pine Prairie dome, Evangeline Parish. If it comes in a producer, this well, the 4-B LaDonois, will extend the Wilcox sand possibilities on the southwest flank.

Beauregard Parish.—Sohio Producing Co.'s 12,000-ft. test, 1 Lutcher-Moore Lumber Co., 1¾ miles west of Fields, was at total depth of 10,911 ft. The operators believe the Wilcox was encountered between 10,761 and 10,854 ft. While drilling at 10,911 ft. in sand the well began kicking. General Crude Oil Co. has staked location for its second test in the Bear field, 1 Cooley-McDonald, 21-6s-9w.

Acadia Parish.—Amerada Petroleum Corp.'s 1 Daigle, at total depth of 10,500 ft., was running casing preparatory to a production test. This well, 1¼ miles northeast of Church Point, may open a new field or record a major extension of a semi-proven area. It is about a mile from noncommercial production found by Stanolind Oil & Gas Co. in the Lewisburg area 2 years ago.

Terrebonne Parish.—Humble's 1-C Continental Iand & Fur Co., 4 miles south of the Gibson field, was shut down at 11,512 ft. in shale and lime while running dip meter. An electrical survey was run at 11,460 ft. and side-wall samples were taken. No shows were reported.



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SOUTHWEST TEXAS

Heavy Leasing in Willacy And Hidalgo Counties

CORPUS CHRISTI, Tex. — Brisk drilling operations in Willacy and Hidalgo counties are foreshadowed by recent lease transactions and by spotting of locations in both wildcat and proven areas. A lively lease and royalty play has been touched off by Baldridge & King's southeasterly extension of the Willamar field in Willacy County. That firm's 1 Cavazos has been completed with initial production of 335 bbl. of oil daily. Texas Co. was expected to be spudding before the close of the week at 1 Yturria Land & Livestock Co., 5 miles northeast of Yturria, Willacy County, a projected 10,000-ft. test to be drilled with the rig used in drilling the 1 Cavazos. Standard Oil Co. of Kansas has filed intention to drill two tests in this area, and according to report three other tests are on its schedule. Sinclair Prairie 1 Wertz, a mile east of Raymondville, Willacy County, was drilling at 7,584 ft. in shale at latest report. Carl I. Olsen had not yet got started on his 1 W. Lincoln, 8½ miles southeast of the Willamar field.

R. J. St. Germain, Houston independent operator, has farmed out 71.8 acres in the San Juan de Carricitos grant, Willacy County, to C. H. Lyons, of Shreveport, La. Sabine Production Co. has farmed out 50 acres to Lyons in the same grant. Baldridge & King's extension well is in the grant. Lyons will drill a well on the St. Germain tract as soon as necessary details have been taken care of.

Lively leasing operations in the Mercedes district of Hidalgo County, which began several weeks ago, continue. W. T. Helis has acquired leases on 150 more acres in the Llano grant. Most of the acreage is in 10 to 40-acre tracts. Helis has not announced his plans for development. Texas Co. has obtained 5-year leases on 240 acres in San Salvador del Tule grant. Arkansas Fuel Oil Co. has assigned 7,358 acres in Santa Anita grant to Earl Baldridge and associates.

LOWER GULF COAST WILDCAT COMPLETIONS

De Witt County: Humble I L. T. Burns, 3 mi. S of Stratton, dry at 8,148 ft.

Nueces County: J. E. Thomas 1 Jalufka, 3 mi. SW of Clarkswood, dry at 6,513 ft.

Victoria County: Bridwell Oil Co. 1 J. F. Whitney, 9½ mi. S of Victoria, dry at 4,805 ft.

Willacy County: Baldridge & King 1 J. C. Cavazos, 6 mi. SE of Willamar, 335 bbl. through ¼-in. choke, T.P. 335 lb., S.I.C.P. 685 lb., gas-oil ratio 700, perf. 7,930-59 ft., T.D. 7,959 ft. Extends Willamar field about 2 mi. to southeast.

SOUTH TEXAS WILDCAT COMPLETIONS

Duval County: J. W. Gorman 1 C. J. Bain, 5 mi. N of Casa Blanca field, dry at 2,268 ft.

Hiawatha Oil & Gas Co. 24 Southland Life Insurance Co., 1 mi. N of Southland field, dry at 5,335 ft.

Live Oak County: Continental 5 Albert W. West et al, 2 mi. SW of Oakville, dry at 1,448 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Medina County: M. M. Roark et al 1 D. W. Wiemers, 3 mi. SE of Hondo, dry at 690 ft.

Williamson County: A. A. Zinzinia 1 H. Bland estate, ½ mi. E of Taylor, dry at 675 ft.

ILLINOIS

McClosky Lime Pool Opener In Edwards County

MATTOON, Ill.—Ray Ryan and W. G. Fortner opened a McClosky lime pool in Edwards County in the past week with their 1 Ralston, C E½ SW SE 9-1n 10e, south of the Maple Grove pool which is in Section 4 opened by Illinois Producing Co. in Section 4-1n-10e. The Ryan-Ralston test swabbed and flowed through casing an average of 407 bbl. per day for four days following an acid treatment in McClosky lime which lay at 3.271-76 ft and 3.319-24 ft. Then it flowed an initial of 758 bbl. through tubing. It was the well of the week in an otherwise drab period of too many dry holes. Excluding the production of the above well the 21 other completed oil wells averaged only 78 bbl. per day per well in initial output, and of the total of 47 new completions 24 were dry holes.

Edwards County had another pool opener in G. C. Schoonmaker, Mabee Oil & Gas Co. and Ashland Refining Co. 1 Cowling, SW NE SW completed in Aux Vases sand at 2.991-3,017 ft., which was shot. The well produced 181 bbl. initially.

Thirty-four new operations were started in the state during the week including these wildcats: Skelly Oil Co. 1 Ramming, SW SW NE 24-5s-10e, White County; Lomelino & Williams 1, farm not named, C NE SE NW 14-5s-7e, Hamilton County: H. S. Williams et al 1 McGee, NW NW SE 22-5n-5e, Clay County: F. D. Walker 1 H. P. Shields, SE SE SE 21-10n-8e, Cumberland County; C. E. Stout 1 J. Hooker, C SW NW 16-6n-6e, Effingham County; C. A. Obering 1 John McGee, NE NE SW 30-5n-7e, Clay County.

ILLINOIS WILDCAT COMPLETIONS

Clinton County: Texas 1 Stokes, SW SW SE 17-2n-1w, dry at 1,699 ft., Glen Dean 1,106 ft., Golconda 1,169 ft., Barlow 1,250 ft., Cypress 1,321 ft., Paint Creek 1,366 ft., Benoist 1,449 ft., lower Renault 1,474 ft., Aux Vases 1,475 ft. and 1,555 ft., Ste. Genevieve 1,577 ft., Rosiclare 1,614 ft., Fredonia 1,646 ft., McClosky 1,648-99 ft.

Crawford County: Heath Oil 1 Heath & Son, NW SE SE 15-6n-12w, dry at 1,038 ft., Biehl sand at 1,028-38 ft. shot.

Edwards County: Mabee 1 Cowling, SW NE SW 20-2s-14w, pumped 180 bbl. oil, Aux Vases 2,991-3,017 ft., shot. Pool opener.

Ryan & Fortner 1 Ralston, C E½ SW SE 9-1n-10e, swabbed and flowed through casing for 4 days at the rate of 407 bbl. per day, completed through tubing 758 bbl. per day, McClosky lime at 3,271-76 ft. and 3,319-24 ft., acid, T.D 3,340 ft. Pool opener.

Fayette County: C. M. Faulkner, C N½ SW SE 7-8n-4e, dry at 1,537 ft.

Gallatin County: Nate Davis et al 1 R. S. Tate, C SE NE 30-8s-10e, dry at 2,944 ft., lower Menard 2,021 ft., Waltersburg 2,041 ft., Vienna 2,069 ft., Tar Springs 2,159 ft., Glen Dean lower 2,227 ft., Golconda 2,309 ft., Barlow 2,448 ft., Cypress 2,506 ft., Benoist 2,663 ft., upper Renault 2,668 ft., lower Renault 2,728 ft., Aux Vases 2,762 ft., Ste. Genevieve 2,780 ft., McClosky 2,840-49 ft. and 2,862-70 ft., St. Louis 2,940 ft.

Jefferson County: Magnolia 1 Davis-Vallowe, NE NW NE 18-3s-3e, dry at 2,907 ft., St. Louis lime at 2,889 ft.

Lawrence County: J. E. Bauer et al, NW SE NW 24-3n-11w, dry at 1,900 ft., Golconda 1,465 ft., Barlow 1,555 ft., Cypress 1,625 ft., Paint Creek 1,678 ft., Benoist 1,688 ft., Renault 1,735 ft., Ste Genevieve 1,774 ft., McClosky 1,844 ft., St. Louis 1,890 ft.

Putnam County: Fuller & Turner 1, McGhay, C E½ E½ 3-31n-1w, dry at 2,000 ft., Silurian 625 ft., Maquoketa 1,185 ft., Trenton 1,725 ft., Shakopee dolomite 1,845 ft.

Richland County: Case Pomeroy 1 Hinderliter, C SE SW 2-1n-14w, dry at 2,980 ft., Glen Dean 2,328 ft., Golconda 2,414 ft., Barlow 2,512 ft., Cypress 2,572 ft. Benoist 2,684 ft., Renault 2,793 ft., Aux Vases 2,799 ft., Ste. Genevieve 2,840 ft. Fredonia 2,846 ft., McClosky 2,892-2,902 ft.

Seaboard 1 O. A. Gates, C E½ SW SW 2-1n-14w, dry at 2,937 ft., Glen Dean 2,360 ft., Barlow 2,545 ft., Ste. Genevieve 2,900 ft., McClosky 2,902-12 ft. and 2,919-32 ft.

Wabash County: John F. Dow 1 A. L. Ghee, NE NE NE 13-1n-12w, pumped 65 bbl., Biehl sand 1,442-72 ft., shot. T.D. 1,503 ft.

C. V. Bay 1 Hershey, NE NE SW 9-1n-13w, dry at 2,716 ft., Glen Dean 2,170 ft., Barlow 2,362 ft., Cypress 2,400 ft., Benoist 2,531 ft., Ste. Genevieve 2,662 ft., McClosky 2,712-16 ft.

Magnolia 1 Newkirk-Hayes, SW SW SW 35-1n-13w, dry at 2,712 ft., Biehl sand 1,700 ft., Menard 1,838 ft., Vienna 1,932 ft., Tar Springs 1,950 ft., upper Glen Dean 2,022 ft., Barlow 2,244 ft., Ste Genevieve 2,557 ft. No McClosky lime.

Wayne County: H. H. Weinert 1 O. H. Gray, SE SW SW 22-1s-8e, dry at 3,262 ft., upper Glen Dean 2,634 ft., lower Glen Dean 2,654 ft., Barlow 2,831 ft., Aux Vases 3,185 ft., Ste. Genevieve 3,186 ft., Fredonia 3,234 ft., McClosky 3,239-47 ft.

Stanolind 1 J. H. Arnold, SW NW SW 23-1n-9e, dry at 3,384 ft., Menard 2,410 ft., lower Menard 2,428 ft., Waltersburg 2,480 ft., Vienna 2,579 ft., Tar Springs 2,620 ft., Glen Dean 2,657 ft. and 2,680 ft., Golconda 2,768 ft., Barlow 2,886 ft., Cypress 2,909 ft., Weiler 2,949 ft., Paint Creek lime 3,065 ft., Paint Creek sand 3,092 ft., Benoist 3,129 ft., Aux Vases 3,195 ft., Ste. Genevieve 3,259 ft., Fredonia 3,300 ft., McClosky 3,304-24 ft.

White County: Mabee 1 Anderson, SW SW SE 8-6s-10e, dry at 3,293 ft., Glen Dean 2,596 ft., Golconda 2,694 ft., Barlow 2,815 ft., Renault 3,030 ft., no Aux Vases. Ste. Genevieve 3,114 ft., Levias 3,114-28 ft., St. Louis lime 3,290 ft.

Herndon 1 Brown, C S½ NW SE 10-5s-10e, dry at 3,168 ft., Tar Springs 2,406 ft., upper Glen Dean 2,482 ft., Golconda 2,553 ft., Barlow 2,662 ft., Cypress 2,720 ft., Benoist 2,876 ft., Aux Vases 2,978 ft., Ste. Genevieve 3,002 ft. No McClosky.

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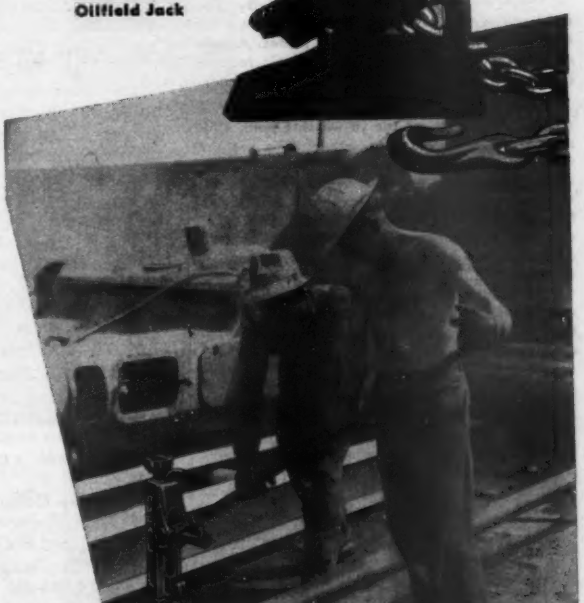

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N. CENTRAL TEXAS

Ellenburger Oil Found West Of Consolidated Field

WICHITA FALLS, Tex.—W. T. Waggoner estate 1 "MM" Waggoner estate, Section 8, Block 17, H.&T.C. Ry. Survey, 12 miles south of Harrold and 3 miles west of the Consolidated-Ellenburger field, opened a new Ellenburger field when it flowed 99 bbl. of oil in 3 hours through ⅜-in. choke on tubing, with 500 lb. casing pressure and 200 lb. tubing pressure, gas-oil ratio 600 to 1. Top of the Ellenburger was logged at 4,460 ft., and the hole is bottomed at 4,509 ft., where 7-in. casing is cemented. The pipe was perforated with 139 shots from 4,429-91 ft., and 2,000 gal. acid were used. Before the official test, the well flowed 35 bbl. per hour until all storage was filled. All of the acreage around the new strike is owned by the W. T. Waggoner estate.

Archer County.—S. D. Johnson 1 William Coleman, 2 miles north of Scotland, shot with 25 qt. nitroglycerin from 5,696-5,716 ft., reported 750 ft. fluid in the hole, ran tubing, and was testing. The oil is coming from Bend conglomerate.

Wichita County.—Consolidated Oil Co. 1 Alex Davidson, 3 miles south of Wichita Falls, and a mile south of the new Airport field opened by the same operator last week, opened a new Ellenburger producing area when it flowed 52 bbl. first hour, 50 bbl. second hour of 2-hour potential test. The well, which is located 495 ft. from north, 1,815 ft. from east lines of west half of J. R. McDowell Survey, topped Mississippi lime at 5,325 ft., Ellenburger at 5,350 ft., and pay lime at 5,353 ft., with total depth 5,364 ft. The operator is moving derrick 1,320 ft. due south for 2 Davidson. Another Ellenburger wildcat location was staked by A. R. Dillard for 1 Mrs. Ed Waggoner, 673 ft. from north, 6,415 ft. from east, Robert Evans Survevy, 3 miles west of Wichita Falls, to go 5,800 ft.

Montague County.—Continental Oil Co. 1 J. G. Spencer, 330 ft. from south and west lines E. Green Survey, 4 miles north of St. Jo, is new wildcat location for 4,500-ft. rotary test. A good well was assured for the same company in the Hildreth pool when its 1 Clisbee flowed 158 bbl. in 1 hour through ⅞-in. choke with 1,000 lb. casing pressure and 750 lb. tubing pressure. The well was drilled to 7,413 ft. in dolomite, and plugged back to 7,236 ft., and the pay from 7,210-36 ft. shot with 25 qt. nitroglycerin.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: Fortex Oil 1 E. Colgan, 330 ft. from S and E, 80-ac. lease, Sec. 2470, T.E.&L. Sur., dry, T.D. 1,554 ft.

Clay County: John L. Webb 1 Taylor estate, Blk. 72, Taylor subd., dry, T.D. 1,360 ft.

Jack County: Continental Oil 1 Weir, 330 ft. from S and E, G. Kaltrider Sur., 6 mi. NW Jacksboro, I.P. 67 bbl., Strawn sand pay 2,327-39 ft., perf. 2,322-32 ft., Caddo 4,724-61 ft., Mississippi 5,714 ft., P.B. to 2,460 ft. from T.D. 6,011 ft. Discovery.

Wichita County: Consolidated Oil 1 Alex Davidson, 495 ft. from N, 1,850 ft. from E, W½ J. R. McDowell Sur., 3 mi. S Wichita Falls, flow 1,234 bbl., Ellenburger pay 5,353-64 ft., K.M.A. 4,342 ft., Mississippi 5,325 ft., Ellenburger 5,350 ft., T.D. 5,364 ft. Discovery.

Wilbarger County: W. T. Waggoner est. 1-MM fee, 660 ft. from N and E, Sec. 8, Blk. 17, H.&T.C. Ry. Sur., 12 mi. S Harrold, 3 mi. W Consolidated pool, flow 792 bbl., Ellenburger pay 4,460 ft., perf. 139 shots 4,429-34 ft., acid 2,000 gal., Caddo 4,082-97 ft., T.D. 4,509 ft. Discovery.

W. T. Waggoner est. 1-OO fee, Sec. 38, Blk. 4, H.&T.C. Ry. Sur., dry, T.D. 1,993 ft.

Young County: Deep Rock Oil 1 R. L. Morrison, 330 ft. from S and E N¼ F. McLaurin Sur., flow 268 bbl., ¼-in. choke, 43 gravity, Mississippi lime pay 4,439 ft., Caddo 3,624 ft., Marble Falls 4,060 ft., T.D. 4,457 ft. Discovery.

WEST CENTRAL TEXAS

ABILENE, Tex.—The new Corbett Ranch field of northeast Stephens County, opened last month by Ben F. Read 1 Corbett, Section 1092, T.E. &L. Survey, 4 miles east of Ivan, appeared to have two disappointments this week, when the west and north offsets to the discovery failed to kick off after the pay zone was acidized. The 2 Corbett, west offset in Section 1062, T.E.&L. Survey, total depth 4,175 ft., perforated with 25 shots from 4,130-39 ft., acidized with 3,000 and 8,000 gal., with no results, and was plugged back to 4,100 ft. The 3 Corbett, north offset, total depth 4,143 ft., perforated 81 shots from 3,986-4,100 ft., acidized with 750 gal., was testing. The discovery well made 850 bbl. per day from 3,950-51 ft.

A small pumper appeared in prospect for the Boyd pool of Stonewall County. Humble Oil & Refining 1 Gholson, Section 44, Block D, H.&T.C. Ry. Survey, had Palo Pinto lime from 4,709-18 ft., total depth, acidized 5,000 gal. and cleaned itself into pits but would not flow steadily, and was being put on the pump.

A dual completion in the Wimberly pool at Butler & Horne Drilling Co. 5-A A. M. Wimberly, Lot 86, League 126, De Witt County School Land, yielded good production from two pays. The upper pay from 2,310-24 ft. was good for 666 bbl. per day, and the lower lime pay, from 2,372-2,475 ft. flowed at the rate of 1,236 bbl. per day based on a flow of 103 bbl. in 2 hours. The lower pay was perforated with 60 shots from 2,378-2,402 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Jones County: G. M. Gillespie 1 J. J. Roberts, 1,980 ft. from N and W, Sec. 47, Orphan Asylum Land, elev. 1,739 ft., Palo Pinto lime 3,687 ft., dry, T.D. 3,888 ft.

Shackelford County: Harry Hines 1 A. H. Swenson, E. P. Swenson Sur., dry, T.D. 2,006 ft.

Roeser & Pendleton A-5 W. I. Cook est., 990 ft. from N and W, Sec. 116, E.T.R.R. Sur., dry, T.D. 1,765 ft.

MICHIGAN

Large Flow Reported From Clare County Discovery

SAGINAW, Mich.—Major interest of Michigan oil operators shifted northward—to Clare County—again last week as the result of a promising wildcat discovery in Hatton Township, 18n-4w, where Ranch Oil Co., drilling its second test on land in Section 31, brought in a well which was reported to have flowed as high as 300 bbl. an hour from the Dundee formation at a total depth of 3,962 ft. At the week end, the flow continued strong, having been pinched to 500 bbl. a day as storage facilities were taxed.

The week was one of the most active of the year from a completion standpoint, the operations being recorded in 15 counties and resulting in 11 new oil-producing wells, three gas producers and eight dry holes.

Wildcatting operations were far more than normally successful as three other tests, in addition to the one in Clare, brought new possibilities. Chief of these is a wildcat in Rose Lake Township (19n-9w), Osceola County, which flowed 386 bbl. pinched in the first 24 hours after acid treatment. Other production came from three wells completed in Bay County, two in Mecosta, one in Van Buren and two others in Osceola in addition to the wildcat test.

The state Conservation Department issued 17 more drilling permits, bringing the 1943 total to 340. There are four tests in Mecosta County, three in Newaygo, two each in Van Buren, Arenac, Allegan and Osceola, one each in Bay and Clinton counties.

WILDCAT COMPLETIONS

Allegan County, Valley Township: Miller Brothers 1 Hitzschke-Kaurizinski, SE SW NE 16-2n-14w, dry in Traverse limestone, T.D. 1,360 ft.

Cass County, Silver Creek Township: Otto Lund 4 Flynn, SE SW SW 14-5s-16w, dry hole, T.D. 816 ft.

Clare County, Hatton Township: Ranch Oil Co. 2 fee, SE SW NW 31-18n-4w, initial daily potential 7,200 bbl., est., from Dundee, flow pinched to 500 bbl. daily, T.D. 3,962 ft.

Gladwin County, Grim Township: Stork Oil Co. 1 Emerson, SE SE SE 32-18n-2e, dry hole, T.D. 2,324 ft.

Lake County, Pinora Township: Ohio Oil Co. 2 Peiser, C S½ NW NW 18-18n-11w, show of oil in Monroe around 3,600 ft., completed as dry hole, T.D. 3,658 ft.

Muskegon County, Holton Township: Muskegon Development Co. 1 Rupar, C NW NW 2-12n-15w, dry hole, T.D. 2,750 ft.

Osceola County, Cedar Township: Sun Oil Co. 1 Bowman, C S½ NE NE 6-18n-9w, produced 227 bbl. oil and some salt water, natural, on 15½-hr. test, T.D. 3,317 ft.

Rose Lake Township; Union Drilling & Production Co. and Hunter Atha 1 Allen, C S½ SW SE 31-19n-9w, flowed 386 bbl., pinched, first 24 hr. after acidizing, T.D. 3,990 ft.

Van Buren County, Bangor Township: Harris Oil Co. 1 Watkins, SW NW SW 14-2s-16w, pumping 30 bbl., acidized, T.D. 1,037 ft.

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HARRISBURG STEEL CORPORATION

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CANADIAN FIELDS

Overthrust Encountered on West Flank of Turner Valley

CHATHAM, Ont.—On the west flank of North Turner Valley extension, Northwest-Hudson's Bay 13, LSD 9, 8-21-3w5, has encountered a situation unique in Turner Valley drilling. The test first got the Madison limestone at 7,255 ft. and after drilling through both porous zones reverted to the Kootenay formation at 7,808 ft. At 9,012 ft. the drill a second time entered the Madison and is now more than 306 ft. in the formation.

Edgerton.—In the Edgerton district, east-central Alberta, Edgerton Oil Syndicate 1, LSD 1, 19-43-4w4, encountered several small oil shows with a larger showing at 2,210 ft. Test was deepened to 2,469 ft., where a substantial show of oil and gas was struck. Production test is being made. Location is in a wildcat area some 20 miles southeast of Wainwright.

Lloydminster.—In the Lloydminster area, in eastern Alberta close to the Saskatchewan boundary, R. L. Shaw-Sparky 1, LSD 8, 32-49-1w4, has encountered an oil showing in a horizon corresponding to the Lloydminster gas sand. The 7-in. casing has been set at 1,970 ft. and production test is being made. Bailing tests failed to lower the level of oil in the casing, and a pumping outfit is being secured. The oil is a black heavy product, similar to the Wainwright crude.

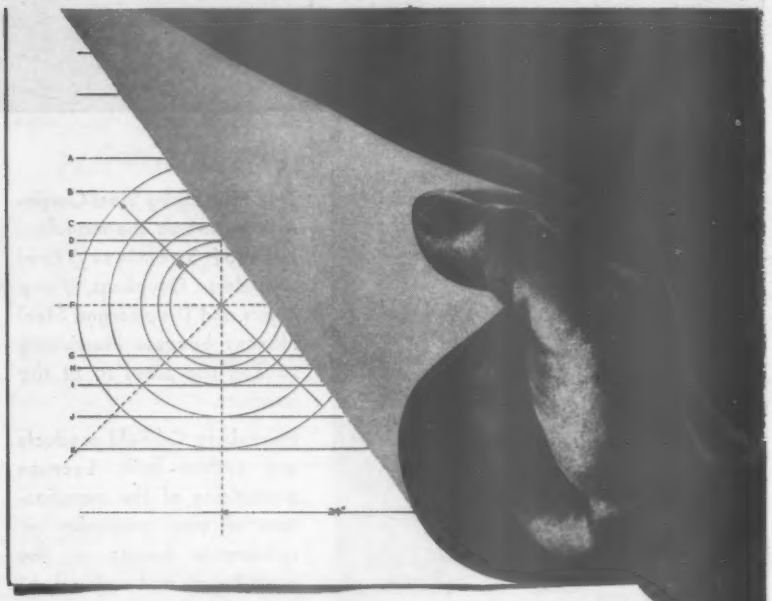
Ram River.—In the Ram River area, in the northern Alberta foothills west of Rocky Mountain House, Ram River Oils 2, LSD 8, 1-37-11w5, bottoming in the Devonian limestone at 4,340 ft., has been producing through 2-in. tubing, flowing by heads and making around 33 bbl. daily of 40-gravity crude. The well is being acidized in the Devonian limestone to make a commercial producer. It has around 300 lb. pressure on the casing and blows crude over the crown block after a 12-hour shut in. Site for Ram River 3 has been cleared 1,320 ft. north of No. 2, and Ram River 4 is being spotted 14 miles to the southeast and will be drilled to determine the extent of the structure. Two rigs will be operated simultaneously.

Pincher Creek. — In the Pincher Creek area, in the southern Alberta foothills near the Montana boundary, Gulf Oil Co. and associated interests have reserved large blocks of acreage from Todd Creek in the northwest to Pincher Creek in the southwest, taking in the former Watson structure. A seismographic survey will be made west, north and south of Pincher Creek. Two tests were drilled in the area by Weymarn Petroleums, but failed to reach the Madison limestone, though substantial showings of light crude were met in horizons above the lime.

Pouce Coupe.—In the Pouce Coupe district, in northern Alberta west of Peace River, Alaska Highway Oil & Gas (formerly Bonanza Royalties 1) has developed a good commercial natural gas production at 2,168 ft. The well is 25 miles from Dawson Creek, British Columbia, which is on the Alaska Highway, and arrangements are being considered for piping the production to that point. Additional drilling may be undertaken.

Athabaska.—In the Athabaska field, northern Alberta, Deca 2, LSD 3, 16-66-23w4, has been finished around 1,686 ft. as a gasser. The flow, first estimated 15,000,000 cu. ft. daily, has increased to 25,000,000 cu. ft. Part of the core from 1,654 to 1,663 ft. showed oil saturation. Casing was set at 1,674 ft., on top the Grand Rapids sandstone, shutting off the oil, but this horizon may later be tested by gun-perforating. It was felt, however, it would be better to finish the well as a gasser. The test was sponsored jointly by East Crest Oil Co. and Davies Petroleums. Tentative locations have been made for two other wells. Deca 1, LSD 1, 4-66-22w3, is located 6 miles east of the discovery. Deca 3, to be drilled by General Petroleums, will be 2¾ miles southwest of the discov-

(Continued on Page 102)



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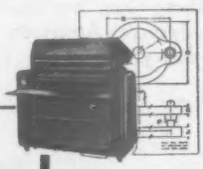

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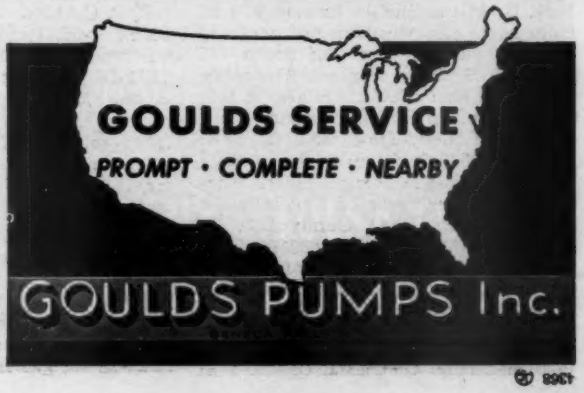


EASTERN TEXAS

Small Extension to Manziel Pool Found

DALLAS, Tex.—Shell Oil Co., Inc., 1 M. C. Shepherd, John Polk Survey, ½ mile southwest of the Manziel pool discovery from the Paluxy, and separated from it by a dry hole drilled to 6,503 ft. by Magnolia Petroleum Co., drilled to 6,687 ft., plugged back to 6,404 ft., perforated casing with 52 shots from 6,375-88 ft., circulated with 250 bbl. oil, and flowed a small stream of oil to indicate an extension to the pool. Originally the test was slated to go to the Smackover, but the encouraging shows encountered in the Paluxy caused the plug back and test. The well logged Woodbine at 4,477 ft., Georgetown lime at 5,150 ft., the Goodland was faulted out and a fault was cut into the Paluxy at 6,373 ft., with the Glen Rose at 6,620 ft. Four new wells were added to the Quitman pool during the week, one extending the producing area almost a mile to the southwest. It was Rogers Lacy 1 M. H. Cox, James Barfield Survey, which was completed for 605 bbl. per day through perforations 6,260-6,300 ft. A short north extension was afforded by Delta Drilling Co. 1 H. H. Green, S. Calderon Survey, which was completed for 820 bbl. from 6,280-6,310 ft.

Camp County.—H. S. Moss 1-B Venters unit, east extension for the Pittsburg pool producing from the Travis Peak, had first oil from 7,992-8,020 ft., second oil from 8,064-89 ft., top Travis Peak at 8,140 ft., and cemented 5½-in. casing at 8,140 ft. One and one-half miles southwest of the pool, the same operator has staked location for 1 Claude Williams, on the shores of Ferndale Lake.

Several interesting wildcats were staked during the week. In Anderson County, 2 miles north of the Concord Woodbine sand producing area, Carter-Gragg Oil Co. 1 Nannie Jaramillo is located 500 ft. from south and west lines of 40-acre unit in Elizabeth Groce Survey, and will go to 5,000 ft. In Bowie County, Permac Oil Co. 1 N. B. Misseldine is located 330 ft. from north and west lines of north 50 acres of east 100 acres of south 145 acres of S. Pore Survey, 2½ miles north and east of Carbondale, to test the Paluxy. In Houston County, Continental 1 Leo Knot, 330 ft. from northeast, 330 ft. from southeast lines of 54-acre tract in Burrell Morris Survey, 7½ miles west of Lovelady. In Smith County, L. O. Gandy 1 J. M. Plunk is a 6,500-ft. test, 630 ft. from south, 762 ft. from west of 80-acre tract, E. M. Hunt Survey on Van Zandt County line.

EAST TEXAS WILDCAT COMPLETIONS

Houston County: Continental Oil Co. 1 A. Fadell, 7,250 ft. from NE, 1,525 ft. from NW M. J. Chamar Sur., elev. 263 ft., no release on tops, dry, T.D. 4,973 ft.

Marion County: J. M. Horne 1 T. L. Torrans, Jr., 617 ft. from N, 507 ft. from SW, 203-ac. tract, T. J. White Sur., elev. 188 ft., Blossom 1,986-2,073 ft., Georgetown 2,440 ft., dry, T.D. 2,447 ft.

Rusk County: C. C. Thrasher 1 J. W. H. Moore, 700 ft. from SE and SW, 209-ac. tract, Henry Stockman Sur., dry, T.D. 4,039 ft.

Upshur County: J. R. Meeker 1 Herbert Henson et al, 490 ft. from NE, 889 ft. from NW, 75-ac. tract, Robertson Asher Sur., elev. 356 ft., Goodland 4,966-5,009 ft., Paluxy 5,227 ft., salt water, dry, T.D. 5,302 ft.

Wood County: Jackson & Fisher 1 First Natl. Bank of Quitman, 330 ft. from SE and W of tract, 820 ft. from W, 6,800 ft. from S of Jane Duncan Sur., elev. 491 ft., Pecan Gap 3,150 ft., Austin 4,860 ft., Eagleford 5,250 ft., red beds, Woodbine, 5,720 ft., dry, T.D. 6,016 ft.

Hunt County: Humble Oil & Ref. 1 F. F. Graham, 885 ft. from N, 660 ft. from E, 660 ft. from W, 39-ac. tract, Wm. Elam Sur., elev 530 ft., Pecan Gap 1,073 ft., Austin 2,350 ft., Eagleford 2,470 ft., Woodbine 2,972 ft., base Woodbine 3,705 ft., Georgetown 3,850 ft., Fort Worth lime 4,137 ft., Paluxy sand 4,660 ft., faulted into Glen Rose 4,940 ft., Smackover lime 9,013 ft., Eagle Mills salt 9,513 ft., dry, T.D. 9,523 ft.

PERMIAN BASIN

New Pool Northwest of Fullerton Is Opened

MIDLAND, Tex.—Union Oil Co. of California 1 J. D. Biles, NW NE Section 19, Block A-31, Public School Land, 4½ miles northwest of the Fullerton pool which produces from the Clear Fork lime, appears to have opened a new pool, as it flowed at the rate of 30 bbl. fluid per hour during a 63-minute drill-stem test from 7,310-7,457 ft., the total depth. Previously the well had cored oil-stained lime from 6,945-7,005 ft., with the best staining being from 6,955-75 ft. When the drill pipe was withdrawn from the hole, fluid rose 4,000 ft. in the hole, the top 100 ft. being mud and the bottom few feet being water.

A new 11,000-ft. wildcat location was staked in southwest Andrews County by Union Oil Co. of California, to test the Ellenburger horizon. It is 1 E. P. Cowden, C NE SW Section 18, Block A-55, Public School Land, 1½ miles southeast of the hole drilled to 8,012 ft. which showed for a producer in the Mississippi lime, lower Permian at 7,660-7,730 ft. The new test is 11 miles north of the Keystone-Ellenburger discovery, Amon G. Carter C-2 J. B. Walton, and 17 miles west of the Embar-Ellenburger pool.

Pecos County.—A new shallow sand pool was indicated for Pecos County when Ungren & Frazier 1 J. L. Nutt, Section 17, Block 125, T.&St.L. Ry. Survey, 12 miles southwest of the Taylor-Link pool, showed oil from 2,325-28 ft., gas from 2,372-86 ft., and more oil from 2,400-10 ft., where it was shut down. Another 5,500-ft. wildcat test was announced by Bryce McCandless, ½ mile southeast of the town of Owego, SE SW Section 101, Block 11, H.&G.N. Ry. Survey, on land owned by Atlantic Refining Co. Phillips Petroleum Co. 1 Ada Price was drilling below 12,327 ft.

Lubbock County.—J. R. Sharp 1 Mary C. Brown, SW NW Section 113, Block C, B.S.&F. Survey, 16 miles northeast of Lubbock, is a new wildcat location. Amerada Petroleum 1 Kurfees, Section 6, Block N, H.&O.B. Survey, Hale County, was drilling below 7,115 ft. in gray shale.

WEST TEXAS WILDCAT COMPLETIONS

Pecos County: Geo. T. Abell 1 Scharff & Blackmon, 4,950 ft. from S, 2,310 ft. from E, Sec. 4, Blk. 9, H.&G.N. Ry. Sur., dry, T.D. 1,833 ft.

Magnolia Pet. and Anderson-Prichard Oil Corp. 1-96 State-Powell, 1,980 ft. from SE, 660 ft. from SW, Sec. 96, Blk. 10, H.&G.N. Ry. Sur., elev. 2,405 ft., flow 83 bbl. 21.9 gravity, 70 per cent water, Tubb lime pay 3,539 ft., perf. 3,539-42 ft., T.D. 3,557 ft. Discovery.

Herbert M. Ogg 1-C Annie H. McKenzie, 6,510 ft. from N, 1,650 ft. from W, Sec. 17, Blk. 604, G.S.&S.F. Ry. Sur., elev. 3,035 ft., sul. water 2,923 ft., dry, T.D. 2,925 ft.

PANHANDLE

AMARILLO, Tex.—Stanolind Oil & Gas Co. is moving into location for 1 W. H. Green, 660 ft. from north, 1,980 ft. from west lines Labor 36, League 320, Capitol Lands, Oldham County, for a 7,500-ft. test. In Donley County, Shamrock Oil & Gas Co. 1 Adair, John G. Adair Survey, cemented 8-in. casing at 2,963 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—C. T. McLaughlin and Cosden Petroleum Co. 1 State, NW NE 7-17s-33e, discovery prospect northeast of Maljamar pool, Lea County, drilled deeper to 4,204 ft., cleaned out to 4,201 ft., shut in 24 hours, during which time casing pressure built up to 175 lb., and tubing pressure built up to 130 lb., but when opened the well refused to flow because of caving sand. If swabbing fails to make the well kick off and flow, it will be put on pump.

E. B. Clark 1-C Cooper, 3-20s-37e, east edge of Monument field, showed 144,000,000 cu. ft. of gas at 3,550 ft., and was drilling ahead below 3,595 ft. after killing the flow.

In Chaves County, DeKalb Agricultural Association 1 J. P. White, 35-10s-28e, reported oil stains from 2,552-64 ft., and some porosity from 2,564-83 ft., but drill-stem test showed only 40 ft. of slightly gas-cut mud.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Lea County: Neville G. Penrose, Inc., 1 State, 660 ft. from S and E, Sec. 3-16s-33e, anhydrite 1,480 ft., salt 1,610 ft., Yates 2,760 ft., bleeding core 5,015-25 ft., dry, T.D. 5,102 ft.

TEXAS GULF COAST

Manpower Shortage Slows Wildcat Activity

HOUSTON, Tex.—Shortage of manpower is declared to have become a serious deterrent to drilling operations in the Gulf Coast territory and it is pointed to as one reason the PAW's hopes for the opening of new oil fields cannot be fulfilled this year. Various instances of wildcat tests being held up for lack of drilling crews are reported, and some drilling contractors say they are making no effort to use their rigs because of the difficulty of finding experienced men to handle them. Work on new wells frequently has to wait until a crew from some other operation is released.

Wharton County promises to be a scene of lively wildcat operation soon. J. F. Hutchins Co. has staked location for 1 F. D. and Donald Duncan a mile northeast of Egypt. According to reports, four other wildcats will be spotted in that area within a few days, three of them in the Louise vicinity. Salt Dome Oil Corp., Boyle & Mayo, and John B. Coffee are the interests named in connection with the Louise projects.

Colorado County.—Magnolia Petroleum Co. made a drill-stem test at 1 Anderson Brothers, 1½ miles southwest of Chesterville, from perforations at 6,493-94 ft., using ¼-in. choke at top and ⅜-in. choke at bottom. It showed no pressure and recovered 30 ft. of drilling mud. At latest report, operator was drilling out at 6,881 ft. Total depth is 12,011 ft. in shale.

Harris County. — Side-wall cores taken by Continental Oil Co. at its 1 J. S. Millenger, 2½ miles northwest of Aldine, yielded no encouragement, it was reported. Total depth was 7,765 ft. Humble Oil & Refining Co. has staked location for 2 E. O. Cox, an outpost test southeast of the Friendswood field, in the Thomas Choate Survey. Texas Co. 53 Stevenson, north of 52 Stevenson, which found deep Yegua sand production on the east flank of the Humble dome, set surface pipe at 1,020 ft.

Liberty County. — William Helis was rigging up at 1 Hirsch, 7½ miles south of Devers. W. W. West was rigging up at 1 West and associates, a 10,000-ft. test in the Davis Hill dome area. The Kirby pool, on the southwest flank of the Esperson field, has been extended about 3,000 ft. northward by General Crude Oil Co.'s 5-B Welch fee, in the M. Duncan Survey, with initial production of 565 bbl. of oil daily.

TEXAS GULF COAST WILDCAT COMPLETIONS

Fort Bend County: Pure 1 A. C. Woods 2¼ mi. NE of Fresno, dry at 8,321 ft.

Harris County: H. C. Cockburn 1 R. E. Allday, 2½ mi. SE of Dyersdale, dry at 4,875 ft.

Jefferson County: Humble and Shell 1-C McFaddin Trust, 5 mi. SE of La Belle field, dry at 10,332 ft.

San Jacinto County: O. C. Garvey et al 1 T. S. Foster estate, 5 mi. SW of Evergreen, dry at 8,515 ft.

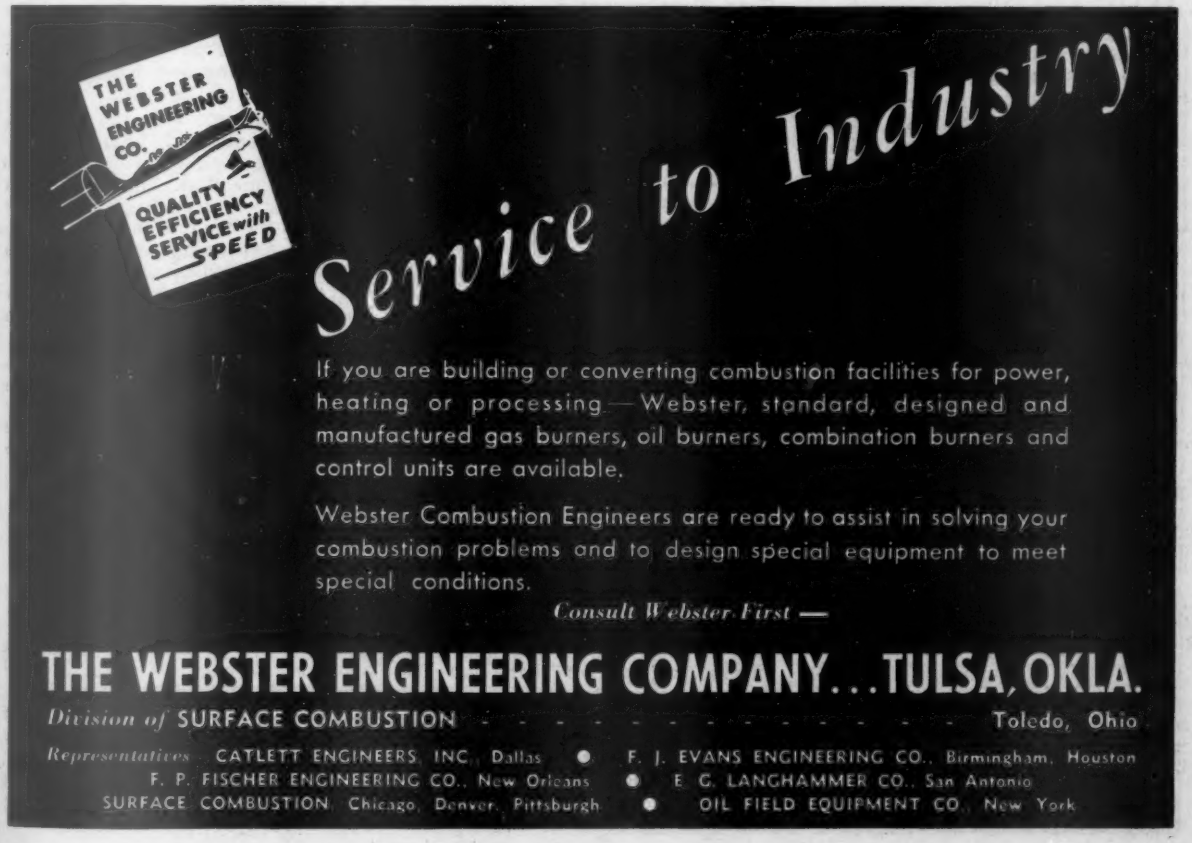
OKLAHOMA

Several Wildcats Near Completion, Shows Reported

OKLAHOMA wildcats were active last week. A number were nearing completion and others reported good shows. Six miles south of Guthrie, in Logan County, Eason Oil Co. 1 School Land, was completed as a gas and distillate well in Pennsylvanian sand.

Pottawatomie County.—Cities Service Oil Co. was building tanks to continue tests at its 1 Lamirand, NE SE SW 27-6n-2e, which was drilled to 5,304 ft. and plugged back to 5,220 ft., where it showed oil, gas and water. A second plug back was to 5,180 ft. shut off water and a 1,000-gal. acid treatment resulted in the well flowing and swabbing about 10 bbl. of oil an hour.

Lincoln County.—J. E. Crosbie 1 Quinlan, SW NE NW 26-12n-3e, 3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miles west of Meeker, ran some 20 ft. high on the Viola lime at 5,425 ft. and was drilling below 5,500 ft. Four other wildcats are drilling in this county, two of which are also near the town of Meeker.

OKLAHOMA WILDCAT COMPLETIONS

Comanche County, Elgin area: Texas Co. 1-C School Land, NW NE 16-3n-10w, flowed 6 bbl., sand 708-90 ft., T.D. 1,470 ft.

Grant County: Barnsdall 1 Baldenston, NE SW SE 24-28n-3w, dry, T.D. 4,821 ft., Layton 3,520 ft., Wilcox 4,802 ft.

Logan County: W. H. Elson 1 Woods, SE SE NE 28-17n-1e, dry, T.D. 5,127 ft., Hunton 4,747 ft., Viola 4,949 ft., Trenton 4,960 ft., Wilcox 5,006 ft., second Wilcox 5,116 ft.

Eason Oil et al 1 School Land, NE SW SW 16-15n-2w, flowed 4,330,000 cu. ft gas and 75 bbl. distillate in 24 hr. Pennsylvanian sand 5,687-97 ft., T.D 6,241 ft., R.P. 1,995 ft.

McIntosh County: W. H. Pine 1 McIntosh SE SE SE 26-11n-15e, 775,000 cu. ft. gas, 500 lb. R.P., Gilcrease 1,707-49 ft., T.D. 3,541 ft. in second Wilcox.

Seminole County: R. H. Purce 1 Baker Community, SE NE NE 29-11n-8e, dry, T.D. 3,539 ft., Cromwell 3,530 ft.

KANSAS

Sun City Northwest Pool Opened in Kansas City Lime

BARBER County received another new pool last week when Pryor & Lockhart 1 Massey, SE NE 27-30-15w, made potential of 91 bbl. of oil a day in the Kansas City lime from 4,322-33 ft. After perforating with 60 shots, the hole filled 2,000 ft. with oil in 11 hours. Total depth was 4,523 ft. in Viola lime topped at 4,498 ft. Location of the new well is 1 mile northwest of the Sun City pool and it will be known as Sun City Northwest.

New pools named.—At a recent meeting of the Kansas Steering Committee on oil-field names, the following were submitted: Barton County, Ed Jonas 1 Ames, SE SW SE 22-18-11w, 287 bbl. in Lansing-Kansas City, discovery of Ames pool. Ellis County, Glathart pool, opened by Coralena Oil Co. 1 Glathart, SE E SE 16-12-19w; N. Appleman and Harbar Drilling Co. opened Riverview pool at their 1 Richards, SE SE SE 19-11-18w, Arbuckle production. McPherson County, Pliny pool, opened by Wolf Creek Oil Co. 1 Karber, S½ SW SE 9-16-1w, Lansing production. Russell County, Sellens Northeast, opened by Mid-Plains 1 Sellens, SW SE NE 22-15-13w, Lansing production. Stafford County, Farmington, opened by Skelly Oil Co. 1 Campbell, SW SE SW 34-24-15w, Arbuckle production.

KANSAS WILDCAT COMPLETIONS

Cowley County: Creekmore & Rooney 1-A Snyder, SW SW NE 7-33-4e, dry, T.D. 3,310 ft., Layton 2,588 ft., Oswego 2,945 ft., Mississippi lime 3,290 ft.

Kiowa County: Superior Oil Corp. of Calif 1 Wright, SW NW 14-30-16w, dry, T.D. 4,915 ft., Lansing 3,938 ft., chat 4,543 ft., Viola 4,590 ft., Simpson 4,690 ft., Arbuckle 4,879 ft.

Phillips County: Phillips Pet. 1 Merklein, SW SW 8-3-19w, dry, T.D. 3,709 ft., Lansing 3,284 ft., Arbuckle 3,654 ft.

Pratt County: Stanolind 1 Griffith, SE NE NW 14-26-13w, dry, T.D. 4,417 ft., Viola 4,209 ft., Simpson 4,297 ft., Arbuckle 4,389 ft.

Rooks County: Gulf 1 Burmitt, SE SW NW 34-10-17w, dry, T.D. 3,535 ft., Lansing 3,134 ft., Simpson 3,467 ft., Arbuckle 3,505 ft., shows of oil at 3,113, 3,511 and 3,516 ft.

Russell County: Vickers Pet. 1 Stroth, NW NE NE 9-15-11w, dry, T.D. 3,300 ft., Lansing 2,890 ft., Arbuckle 3,270 ft.

APPALACHIAN FIELDS

Westmoreland County Wildcat Tops Onondaga

PITTSBURGH, Pa. — In Westmoreland County, Southwest Pennsylvania, an important deep test has reached the Onondaga lime formation. In Boone County, West Virginia a deep test was completed in the Newburg sand with a good showing of gas. In this state several good gas wells were reported, one being in the Oriskany sand.

Westmoreland County.—On Laurel Ridge in Ligonier Township, New Penn Development Co., William E. Snee et al topped the Onondaga lime in 1 John and Eleanor Beck at 8,650 ft. at an elevation of sea level minus 5,866 ft. The top of the chert was recorded at 8,696 ft. They are drilling at 8,700 ft. In Derry Township, Peoples Natural Gas Co. is drilling at 6,401 ft. in the test on the Camilla Giffin farm.

West Virginia

Boone County.—In Peytona district, Boone County, Owens, Libby-Owens completed 655 Bull Creek Coal Land Co. at a depth of 5,358 ft. through the Newburg sand. The final test of gas found in this horizon at 5,235-42 ft. was 215,000 cu. ft.

California Fields

(Continued from Page 92)

had a few feet of Stevens oil sand in its McClung wildcat southeast of the Greeley field and the outcome is still in doubt as drilling operations are still under way. The showings found in this wildcat were between 7,483 ft. and 7,509 ft. but this 26-ft. interval consisted of shale and the thin member of the Stevens oil sand of Miocene age. This wildcat is located in 4-30s-26e, and on a formation test at 7,461-7,513 ft. showed a slight gas blow and seven stands of gas-cut mud. The objective of this wildcat is the Rio Bravo and Vedder zones of Miocene age now that the Stevens has proved barren. Continental's next wildcat in the valley is scheduled to be No. 1-H on Kern County Land property south of the Strand field in 18-30s-26e.

CALIFORNIA WILDCAT COMPLETIONS

Rio Vista gas field, Sacramento County. Standard 5 Midland fee, 4-3n-3e, flowed 13,337,000 cu. ft. gas, no oil, 24/64-in bean, pressures 1,883/1,875 lb., T.D. 5,389 ft., P.B. 5,082 ft., perf. 5,035-43 ft., shut-in pressures 1,965/1,940 lb., probable new productive gas zone.

Tuscan Springs wildcat district, Tehama County: Texas 1-A Walbridge, 32-28n-2w, abandoned as unproductive, T.D. 3,047 ft., 9⅝-in. casing cemented 944 ft., 7-in. casing cemented 1,372 ft., flowed salt water on shutoff test on 9⅝-in. test of interval 1,339-72 ft showed small amount of water, perf. 1,103-12 ft., flowed 300 bbl. water, high head water has prevented successful test.

Walnut Grove wildcat district, Sacramento County: Jergins Oil Co. 1 McCormack 30-5n-5e, abandoned as dry hole, T.D 5,704 ft., 9-1 zone 2,607 ft., Markley zone 2,657 ft., Ione zone 3,179 ft., Capay shale 3,277 ft., Capay zone 3,603 ft. bottomed in Cretaceous all tests proved wet.

Canadian Fields

(Continued from Page 98)

ery. Locations are made with a view to getting oil production which was indicated in the discovery well and more strongly in Athadome 2, drilled east of the discovery some years ago. The nearest large market for the gas production is Edmonton, 80 miles distant, which is at present supplied from the Viking and Kinsella fields at a distance of 125 miles.

Saskatchewan. — In the Kamsack area, Oil Ventures 7, LSD 14, 23-29-32w1, is rigging for a deep test to be carried to the lime. This is the first of a series of three deep tests to be drilled in the shallow gas area. Equipment is also being unloaded for a test to be drilled in a potential shallow oil field a few miles east, near Cody, where surface shows of oil on water courses have been observed.

Fort Norman. — Official figures show that in June the Fort Norman field produced 14,798 bbl. of crude compared with 19,692 bbl. in April and 15 bbl. in May 1942. Production in 1943 up to the end of May aggregated 72,527 bbl., against 146 bbl. the previous year.

A Correction

An omission of a comma was responsible for an error in an article appearing on page 104 of the July 29 issue of The Oil and Gas Journal. The article refers to "a large number of catalytic-cracking plants of the Houdry, Fluid and Thermofor types." The Fluid refers to the fluid-catalyst type of cracking process developed by Standard Oil Co. of New Jersey.

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Fig. 192
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Extra Values in VALVES and PIPE FITTINGS

Completions and Drilling Wells Increased in July

TOTAL completions for the month of July were up 4 per cent over the previous month but 1.6 per cent under July of last year. The number of oil wells, however, showed an increase over both figures. July oil wells were up 7.5 per cent, compared with June, and slightly less than 3 per cent over July 1942. These figures reflect more than the average monthly fluctuation in that June and July were figured on a 4 and 5-week basis, respectively, in nearly all districts. Rigs under way and drilling wells show a larger increase, being up 8.6 per cent over June and 13 per cent higher than a year ago, reflecting a general upturn in almost all areas.

SUMMARY OF OPERATIONS, JULY 1943

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Footage	Rigs and drilling
Appalachian	263	174	324	71	18	3	213	44	3	0	510,175	375
Ohio	82	18	663	30	34	13	23	46	0	0	203,779	188
Indiana	12	2	61	0	10	2	8	0	0	0	21,722	40
Kentucky	45	13	2,189	13	19	2	18	25	0	0	106,185	173
Michigan	60	24	5,903	6	30	1	31	28	0	0	141,098	118
Illinois	152	87	10,514	1	64	3	61	87	1	0	388,889	181
Kansas	143	80	27,198	4	59	0	12	129	2	0	487,422	226
Nebraska	4	0	0	0	4	0	0	4	0	0	14,242	2
Missouri and Iowa	2	0	0	0	2	0	1	1	0	0	4,237	1
Oklahoma	90	43	10,114	2	45	8	16	53	13	0	304,154	317
North Texas	115	49	10,481	0	66	25	42	27	21	0	312,279	65
West Central Texas	42	9	138	0	33	11	16	15	0	0	89,631	27
West Texas	81	70	40,543	0	11	4	13	33	30	1	340,867	74
Texas Panhandle	13	11	2,314	1	1	0	0	13	0	0	38,995	18
East Texas	23	14	4,965	1	8	0	2	9	12	0	119,445	20
Upper Gulf Coast	48	25	4,138	1	22	0	0	15	31	2	296,317	80
Lower Gulf Coast	46	25	3,249	3	18	0	0	10	36	0	277,148	79
South Central Texas	6	2	101	0	4	1	0	3	2	0	19,833	21
South Texas	44	22	2,051	1	21	0	11	19	14	0	181,633	89
Southeast New Mexico	18	15	3,490	0	3	0	2	16	0	0	61,913	35
Arkansas	21	8	1,248	0	13	1	1	12	7	0	92,588	51
North Louisiana	27	12	464	3	12	0	14	6	7	0	87,393	42
Louisiana Gulf	39	20	5,426	1	18	0	3	2	18	16	325,204	95
Mississippi	9	2	507	0	7	0	1	5	3	0	45,505	23
Montana	24	16	1,239	0	8	0	14	10	0	0	53,582	80
Wyoming	17	12	12,799	2	3	1	2	9	5	0	68,611	84
Colorado, Utah	10	6	279	1	3	1	7	0	2	0	23,859	26
Northwest New Mexico	1	0	0	0	1	0	0	1	0	0	4,840	13
California	115	97	10,013	2	16	7	41	50	17	0	356,968	165
Total July	1,552	856	160,610	143	553	85	552	672	224	19	4,978,490	2,695
Total June	1,490	796	137,067	158	536	60	557	628	224	21	4,951,884	2,481
July 1942	1,578	833	197,613	224	521	74	577	665	232	20	5,065,773	2,384

*Does not include 136 input wells.

OHIO, KENTUCKY

Second Wellington Well Makes Big Flow

ZANESVILLE, Ohio. — A second large gas well was completed in the Wellington pool. The completion, by Glen Harmon et al on the Carl Bittner tract in Lot 1, Wellington Township, gaged 12,470,000 cu. ft. from the Clinton sand at 2,398-2,412 ft.

An offset, by the Industrial Gas to their discovery well in Malta Township, Morgan County, was completed as a gas well in the Clinton sand at 4,347-85 ft. with an open flow of 943,000 cu. ft. Brendel is also drilling an offset to the original well and there are indications that this pool will enlarge and become an important gas-producing area.

The Wheeling Oriskany pool was extended 1½ miles to the east by a 700,000-cu. ft. well on the Umstott and Schwyhart consolidated completed by Dr. Hartman. The Wheeling pool, although limited in size, is the most important gas pool in East Central Ohio at this time, having five strings running.

The Clinton gas pool in Wayne and Holmes counties continues to produce good wells. The current one being gaged at 3,220,000 cu. ft. on the L. K. Kopp farm.

OHIO WILDCAT COMPLETIONS

Fairfield County, Richland Township: Kenova 1 A. H. Dickson, Sec. 9, Clinton 2,635-65 ft., 380,000 cu. ft. and 3 bbl. oil, T.D. 2,667 ft.

Lorain County, Rochester Township: Glen Harmon et al 1 William Murray, Lot 2, Clinton, no sand, dry, T.D. 2,406 ft.

WESTERN KENTUCKY

OWENSBORO, Ky. — Ten wells were completed in Union, Henderson, Daviess and McClean counties in western Kentucky. Five were oil wells producing respectively 330, 332, 2, 210, and 285 bbl. initially. The other five were dry.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Union County: Calstar 1 Mason, dry at 2,589 ft.

Sinclair Prairie 1 Noah Hunter, 4 mi. W of Uniontown, dry at 2,865 ft.

Sohio 1 Hancock, 2½ mi. NE of Morganfield, 285 bbl. per day, from Levias lime at 2,531-44 ft. and McClosky lime at 2,568-85 ft., T.D. 2,590 ft.

Pure Oil Co. 1 Kate Mason, 4 mi. W of Spring Grove, dry at 2,780 ft., Ste. Genevieve lime at 2,625 ft.

McClean County: H. H. Vickers 1 Joseph Snyder, ¾ mile N of Livermore, 210 bbl. per day from Tar Springs sand at 1,192-1,205 ft., T.D. 1,209 ft.

Daviess County: Reilly and Barnett 1 Jackson Dosley, 2 mi. S of Stanley, dry at 1,923 ft., McClosky lime 1,804-7 ft. and 1,850-55 ft.

Henderson County: Hupp and Sohio 1 Ohio Valley Trust, 17½ mi. NE of Henderson, dry at 2,242 ft.

INDIANA

EVANSVLLE, Ind. — Two completions were reported in Indiana in the past week, one a dry hole wildcat, the other a 30-bbl. well in Posey County.

INDIANA WILDCAT COMPLETIONS

Posey County: Sinclair-Wyoming 1 C. Grein, NE NE SE 26-8s-14w, dry at 2,873 ft., Barlow lime 2,388 ft., Renault 2,596 ft., Ste. Genevieve 2,676 ft., Levias 2,679 ft., St. Louis 2,835 ft.

North Louisiana

(Continued from Page 90)

ducing from that source and that is the California Co. 1 G. T. Smith in 4-7n-7e, Lincoln County, Mississippi, which is 60 miles southeast. Another well which is now testing this formation is Gulf Oil Corp. 1 Davis in 2-9n-9w, northwestern Wayne County, Mississippi, approximately 150 miles east of the Carter discovery.

ARKANSAS WILDCAT COMPLETIONS

Little River County: Garland-Anthony 1 Simpson, NE SE 35-11s-30w, dry, T.D. 1,263 ft.

Nevada County, S. of Irma-Troy field: Plymouth Oil Co. 2 Groves, SE NE 21-14s-20w, dry, T.D. 5,577 ft.

NORTH LOUISIANA WILDCAT COMPLETIONS

East Carroll Parish: Hunt Oil Co. 1 Continental Land Co., irregular section 77-22n-13e, dry, T.D. 7,404 ft.

MISSISSIPPI

JACKSON, Miss. — Rumors, many of them exaggerated, regarding Gulf Refining Co.'s wildcat test, 1 Aden Davis, in 2-9n-9w, 15 miles northeast of Laurel, Wayne County, have attracted oil prospectors from Louisiana and other states. According to trustworthy reports, the well, at total depth of 7,100 ft., produced 2 to 3 bbl. of oil per hour after swabbing, and upon being shut in for 5 hours and 40 minutes it recorded tubing pressure of 250 lb. Tubing was opened, the well started flowing and pressure fell to zero. In a 12-hour period the well flowed 30 bbl. of oil through open 2-in. tubing.

California Co.'s discovery, 1 G. T. Smith, 4-7n-7e, Lincoln County, has been completed pumping an average of 160 bbl. of oil daily, along with 3 per cent salt water. That company's 1 National Gasoline Co. of Louisiana, Inc., 16 miles east of Natchez, Adams County, was coring at 10,211 ft. in shale. Pure Oil Co.'s 1 J. M. McDowell,, also in Adams County, 16 miles southwest of Natchez, was testing a squeeze job made last May, preliminary to resuming operations following a shutdown necessitated by high water. Humble Oil & Refining Co. was drilling at 7,454 ft. in shale at 1 J. A. Hurst, Greene County. William Helis et al were drilling at 8,666 ft. in shale at 1 T. H. Dinkins, Lawrence County.

MISSISSIPPI WILDCAT COMPLETIONS

Lincoln County: California Co. 1 G. T Smith, 4-7n-7e, pumping average of 160 bbl. daily, plus 3 per cent salt water T.D. 12,229 ft., P.B. 10,461 ft.

Postwar Planning Committee Named by Maritime

Formation of a postwar planning committee, to develop plans for the American shipping industry after the war, has been announced by the Maritime Commission.

The committee is headed by Commissioner Howard L. Vickery, serving as chairman, and Commissioner Thomas M. Woodward, serving as co-chairman. James L. Bates, director, Technical Division, heads a subcommittee to deal with tankers.

Quota Raised 92,000 Bbl.

Texas has been called on by PAW to produce 1,909,000 bbl. of all petroleum liquids daily during September, an increase of 92,000 bbl. over August, of which PAW certified that 72,000 bbl. daily shall be produced from sour-crude oil fields. This is the first time the government agency has ordered increased production from West Texas, which testimony at recent oil-availability hearings of the Railroad Commission revealed as the only district in the state that can substantially increase its production.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the Buffalo Basin gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226), at a sale to be held in the district land office at Cheyenne, Wyoming, at 10 a.m. on September 9, 1943, of the following parcels: Parcel No. 1, T. 47 N., R. 99 W., sec. 7, SW¼ NE¼, W½SE¼; sec. 18, W½E½, E½SW¼; Parcel No. 2, T. 47 N., R. 99 W., sec. 19, lots 1, 2, W½NE¼, E½NW¼, T. 47 N., R. 100 W., sec. 24, E½NE¼, NW¼NE¼; Parcel No. 3, T. 47 N., R. 100 W., sec. 11, NE¼NW¼, E½SE¼, sec. 13, SW¼NW¼; Parcel No. 4, T. 48 N., R. 100 W., sec. 26, E½SW¼, sec. 27, NW¼NE¼, sec. 28, NE¼ NE¼; Parcel No. 5, T. 48 N., R. 100 W., sec. 35, lots 1, 2, NW¼NE¼; Parcel No. 6, T. 48 N., R. 99 W., sec. 31, lot 4, T. 48 N., R. 100 W., sec. 36, lot 7. Each successful bidder must deposit on the date of sale, with the officer in charge of the sale, a certified check on a solvent bank or cash for one-fifth of the amount bid by him, and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. The successful bidder of two or more parcels may consolidate them in a single lease if the total acreage does not exceed 640 acres, and may file a satisfactory collective bond. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid, and a showing of qualifications of the bidder. The envelope should be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Salt Lake City, Utah. Notice is hereby given that the lands herein described within the known geologic structure of the Cisco Dome Gas Field, Utah, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226) at a sale to be held in the United States Land Office at Salt Lake City, Utah, at 10 a.m., August 26 1943, in the following units: Parcel No. 1, T. 20 S., R. 21 E., sec. 3, lots 1, 2, S½NE¼, SE¼; sec. 10, E½. Parcel No. 2, T. 20 S., R 21 E., sec. 3, lots 3, 4, S½NW¼, SW¼; sec 10, W½. Parcel No. 3, T. 20 S., R. 21 E., sec 1, SE¼NE¼, NE¼SE¼, S½SE¼; sec. 9, E½. Parcel No. 4, T. 20 S., R. 22 E., sec. 20, W½SE¼; sec. 29, E½. Parcel No. 5, T. 20 S., R. 22 E., sec. 20, SW¼; sec. 29, W½. Parcel No. 6, T. 20 S., R. 22 E., sec. 30, lots 1, 2, 3, 4, E½, E½W½. Parcel No. 7, T. 20 S., R. 21 E., sec. 22, SE¼SW¼; sec. 26, N½, N½SE¼, SE¼SE¼; sec. 27, N½NE¼, SE¼NE¼. Parcel No. 8, T. 20 S., R. 22 E., sec. 31, lots 1, 2, 3, E½, E½NE¼, NE¼SW¼; T. 21 S., R. 22 E., sec. 5, NW¼NW¼ (unsurveyed); sec. 6, NE¼NE¼ (unsurveyed). Each lease will be made subject to the unit plan for the Cisco Dome Unit Area, Utah, approved June 6, 1942. Mimeographed copies of the plan will be available for distribution to parties interested in bidding at the local land office in Salt Lake City, Utah, and offices of the oil and gas leasing division, Geological Survey at Salt Lake City, Utah, Casper, Wyoming, and Washington, D. C. Upon acceptance by the Secretary of the Interior of any bid for the unsurveyed tracts they will be surveyed at Government expense. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental must be paid prior to the issuance of the lease. Each parcel will be offered for sale separately, but bidders may submit bids for two or more parcels regardless of the acreage involved, since each lease will be made subject to and operated under a prescribed unit plan of development and operation. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior Scott P. Stewart, Register.

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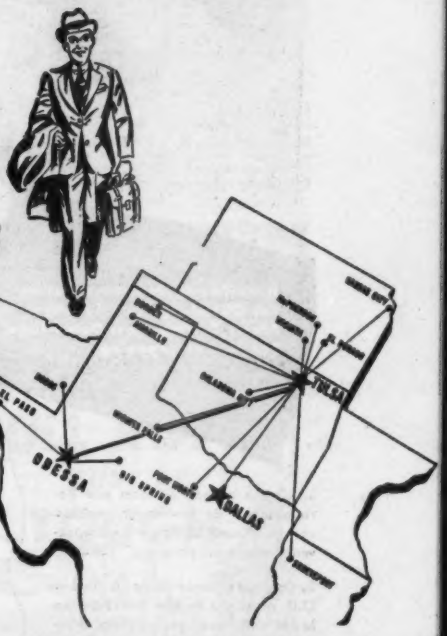

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1 Always include at least one Borium insert at the lower, outside corner of each cutting wing to prevent "diamond pointing." (Sketch)

2. On bits larger than 6 inches O.D a second Borium insert on the lower cutting edge improves drilling efficiency. (Sketch)

3. Cover leading faces of all bit wings with Tube Borium, using screen size of at least 10-20 mesh rather than finer meshes such as 30-40. Tests conclusively prove the larger Borium particles greatly increase drilling speeds.

4. Don't skimp on quantity. Tests show that bit life and efficiency is in direct proportion to the amount of Tube Borium applied (up to 1/8" in thickness).

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Stop wear... Eliminate Repair

Among the

Drilling Contractors

Union Rotary Corp. is the contractor on Sohio Producing Co. 1 C. Bowker, in S½ SE SE 31-19n-9w, Osceola County, Michigan.

Mac Drilling Co., Houston, Tex., was moving in last week at 1 De Huck, in the Nordheim area of De Witt County, Texas, to be drilled for Tide Water Associated Oil Co. This is a semiwildcat, ½ mile from production. Mac got a producer at 3 Parker, in the Fred field, Tyler County, for Stanolind Oil & Gas Co., and potential test was being taken last week. This well is 18 miles north of Silsbee. The 1 A. C. Woods, a wildcat test 2½ miles northeast of Fresno, Fort Bend County, was completed as a dry hole for Pure Oil Co.

Arnold & Gragg are the contractors on a wildcat in Freestone County, Texas, the Wheelock & Collins and associates 1 F. E. Hill, which has completed rigging and been spudded. The well site is north of a Texas Co. block of about 5,000 acres, and is 6,000 ft. west of the courthouse at Fairfield.

M. B. K. Drilling Co., Odessa, Tex., have contract to drill three wells in the Mascho pool of Andrews County, Texas, for Neville G. Penrose, Inc.

Clapsaddle Drilling Co. has the contract on Grimes & Son 1 Grigork, in NW SE NE 21-1s-16w, Van Buren County, Michigan.

Dixie Drilling Co., Houston, Tex., has a contract to drill 8 St. Mary for Atlantic Refining Co. in the Bayou Sale field, St. Mary Parish, Louisiana, and it will drill 32 L. L. & E. in the Paradis field, St. Charles Parish, for Texas Co. It was moving in last week at Unit 3-6, in the Erath field, Vermilion Parish, for Texas, and it was drilling at 10,200 ft. at Unit 35-1 for the same company in that field.

Jim Collins is contractor on Michigan Producers & Refiners, Inc., 1 Trautner, in C S½ SW SW 7-13n-4e, Saginaw County, Michigan.

Helmerich & Payne, Tulsa, have contract to drill Union Oil Co. of California 1 E. P. Cowden, 11,000-ft. Ellenburger wildcat test in southwest Andrews County, Texas, located in NE NW Section 18, Block A-55, Public School Land, 11 miles north of the Keystone-Ellenburger pool, and 17 miles west of the Embar-Ellenburger pool.

Warren & Bradshaw have drilling contract on Stanolind et al 1 Hood, in NW NW NW 9-11n-2e, Pottawatomie County, Oklahoma. The wildcat is on a 640-acre unit block, with Stanolind holding 69.59 per cent interest, Amerada 11.76 per cent, Sun Oil Co. 12.43 per cent and Mid-Continent 6.22 per cent.

Lupher Drilling Co. will drill three tests for Pure Oil Co. in Newaygo County, Michigan. These are the 1 M. S. Anderson, in C E½ NE NE 8-14n-11w; the 1 J. W. Hull, in C E½ SW NW 9-14n-11w, and the 1 E. E. Fetterley, in C E½ NW NW 16-14n-11w. Contractor will also drill E. L. Bennight 1 Reber-Pratt (Comm.), in C SW NE 32-18n-10w, Osceola County, Michigan.

Morris-Hamilton Drilling Co., Houston, Tex., has contracts for two wells to be drilled for Union Oil Co. of California. One is 10 Gray, in the Vinton field, Calcasieu Parish, Louisiana, and the other is 12 Gray, in the Ged field, same parish. Morris-Hamilton also will drill Phillips Petroleum Co. 3 Beaumont, in the Bear field, Beauregard Parish.

T. L. Wheeler, Wichita Falls, Tex., has completed a wildcat dry hole in Jones County, Texas, for G. M. Gillespie et al. The test was Gillespie 1 J. J. Roberts, SE NW Sec. 47, Orphan Asylum lands, 4 miles southeast of Anson, and was finaled at total depth 3,888 ft.

Leonard Drilling Co. has been awarded contract on Mogul Oil Co. 1 Adair, in C S½ SW NW 4-16n-7w, Mecosta County, Michigan. Contractor will also drill two other tests for Mogul Oil, these being 1 Murray, in C S½ SW SW 4-16n-7w, Mecosta County, and 1 J. V. Wicklund, in C S½ NW SW 4-16n-7w, Mecosta County.

C. B. Jetter is the contractor on Jeter & DeKrafft 1 Oscar Simon, in NW SW NE 19-7n-4w, Clinton County, Michigan.

Grey Wolf Drilling Co., Houston, Tex., is moving in for a 12,000-ft. wildcat test, 1 Allen, to be drilled for Gulf Oil Corp. 8 miles south of Brazoria, in Brazoria County, Texas. It has the contract also for 1 Hugo Wuench, a 9,000-ft. test to be drilled for Adams Oil & Gas Co. 4 miles northeast of Yorktown, in De Witt County. If this well proves to be a producer it will extend the gas-condensate field opened by Adams last year

Clifford Perry has been awarded drilling contract on James S. Brailey 1 John Klein-Albert Stankey (Comm.), in NE SW SE 4-3n-14w, Allegan County, Michigan.

H. C. Williams has contract on Charles J. Smith 1 Henry A. and Marthe L. Brooks, in C NW SW 18-1n-13w, Allegan County, Michigan.

Gilger Drilling Co., Houston, Tex., will drill a 6,500-ft. test for Grubb & Hawkins in the Thomas Alsbury Survey, Lochridge field, Brazoria County, Texas. It is the L. G. L. Wood. Gilger expected to resume work this week at 1 Neill, Fort Bend County, a Grubb & Hawkins operation, which had to be shut down at 4,000 ft. on account of high water. This contractor was at 5,800 ft. on a Grubb & Hawkins wildcat on the Tide Water prospect, near Leland, Washington County, Mississippi.

L. O. McMillan, Dallas, Tex., will drill a wildcat Woodbine test in Anderson County, Texas, for Carter-Gragg Oil Co. It will be 1 Nannie Jaramillo, in Elizabeth Groce Survey, 2 miles north of the Concord pool, and will go to 5,000 ft.

C. M. Bagley has drilling contract on O. A. C. Hagan, Inc., 1 Sproul, in C SE SE 32-20n-16w, Caddo Pine Island area, Caddo Parish, Louisiana.

Falcon-Seaboard Drilling Co., Houston, Tex., is rigging up for 1 Jarnigan, to be drilled for Humble Oil & Refining Co. near Roanoke, in the Roanoke field, Jefferson Davis Parish, Louisiana. It is rigging up also at 1 Jackson estate, a 10,600-ft. test to be drilled jointly by this contractor and William Helis in the East Gibson field, Terrebonne Parish. The contracting firm was setting surface pipe last week for 1 Trimble, to be drilled in the Egan field, Acadia Parish, for Sun Oil Co.

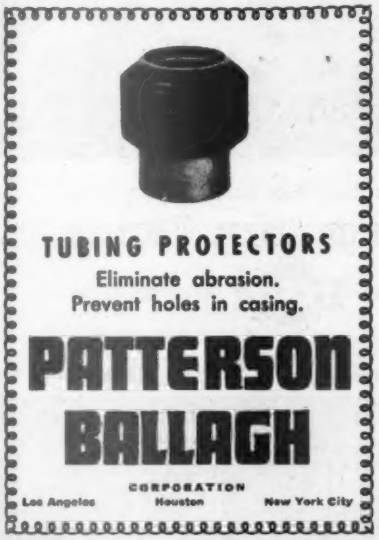
Tom Lee Drilling Co., Pampa, Tex., is the drilling contractor on a 2,300-ft. wildcat in the extreme northern part of Collingsworth County, Texas. The test is being drilled by Jenkins & Portman, of Oklahoma City, Okla., and is the 1 Bell, in SW SE 14-13 H.&G.N. Survey, 3 miles south of the closest production in Wheeler County. The granite wash will be tested.

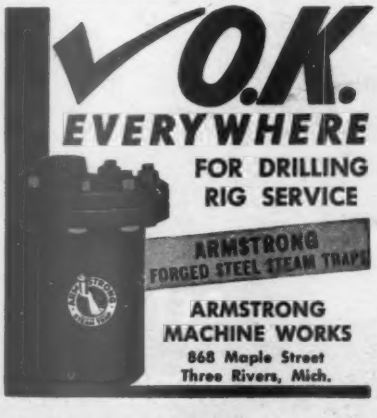
Zephyr Drilling Co., drilling with E. S. Atkins, completed a 3,947-ft. dry hole at the 1 Hudson, in NW NW SE 7-20-5e, Pawnee County, Oklahoma, and was moving rig to the 1 Huffington, in SE SE SW 12-20-51, southwest of Maramac.

Big Chief Drilling Co. and Dickey Oil Co. were rigging up at the 1 Wichita, in C NW SW 33-21n-6e, near Maramec, Pawnee County, Oklahoma, for a Wilcox sand or 3,400-ft. test.

Arrow Drilling Co., Tulsa, has contract to drill a 5,500-ft. wildcat in Pecos County, Texas, for Bryce McCandless. It is his 1-101 Atlantic Refining Co., SE SW Section 101, Block 11, G.H.&H. Ry. Survey, ½ mile southeast of the town of Owego, and will try for Ellenburger production.

Byrne Drilling Contractors, of Dallas, Tex., a newly organized companion organization to the established Byrne Organization, general construction contractors, announce that Harry Hampton, of Houston, Tex., has been placed in charge of all field operations.





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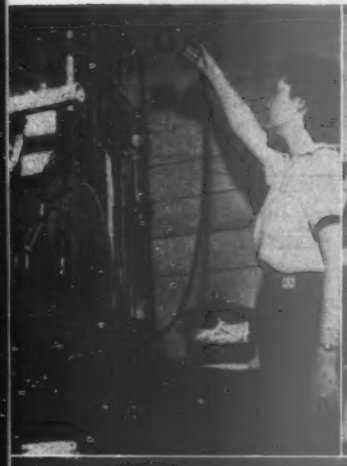
GOOD CASTINGS TESCO HOUSTON, TEXAS

Carbon determination



Manganese determination

Silicon determination

Sulphur determination

TESCO

BETTER STEEL FOR MODERN INDUSTRY

PERSONALS

W. H. BURKE

Sound Practices and Economies Guide Shell Engineer

W. H. (Bill) Burke, division engineer for Shell Oil Co., Inc., Wichita Falls, Tex., was born at Burke, Idaho. He attended grammar school there, but his family moved to Los Angeles, Calif., where he graduated from high school in 1925.

He got his first taste of oil-field work with the old California Petroleum Corp. as a geologist's helper and draftsman in spending a year at this job before entering Stanford University. He received his bachelor of arts degree in 1930, and 2 years later was awarded a degree in petroleum engineering. Just to keep his hand in the oil business, he worked during vacations for Shell Oil Co., Inc., as roustabout and roughneck. While at Stanford, he played football as one might guess from his very husky physique.

His career as petroleum engineer started when he entered Shell Oil Co.'s engineer training program immediately on finishing his academic education. He worked in Kansas, Oklahoma, and Texas in the production engineering departments for Shell, devoting considerable time to reservoir engineering, evaluation work, production studies, and production-problem analysis.

In 1941 he was transferred to Shell's North Texas division as production engineer, and in May 1943 was promoted to division exploitation engineer. He spends most of his time on the job but plays a little golf, describing himself as "a good 120 shooter." He is married and has a son 3 years old.

Mr. Burke is a conservation proponent, and likes to figure out ways of increasing oil reserves by the inexpensive route of sound practice and economical production methods.

L. R. Sunderland, who was employed in the industrial division of the Houston (Tex.) Natural Gas Corp. when he entered war service, has been promoted from second to first lieutenant. He is battalion adjutant of tank destroyers at Camp Hood, Texas, where he attended the officers' candidate school.

Albert T. Crawford, technologist, and **Donald C. Nellis,** junior technologist, at the Wilmington, Calif., refinery of Shell Oil Co., Inc., have been promoted to technical assistants at Dominguez, Calif.

Maj. Charles M. Sherfesee, who was a junior civil engineer in the Tyler, Tex., office of Humble Oil & Refining Co. when he entered military service in November 1940, is now in command of an antiaircraft coast artillery battalion in Africa. He writes that it looks like West Texas.

Leonard R. Seaman has joined British-American Oil Producing Co. as manager of the land and legal department of the company's western division and will maintain headquarters in Los Angeles, Calif. Prior to joining British-American, Mr. Seaman was for 4 years affiliated with Hall Baker Co.

John J. McCrea has been named industrial relations manager for the Fort Worth, Tex., division of Stanoland Oil & Gas Co., being promoted from district production superintendent for East and North Texas. He has been succeeded by **George H. Card,** division engineer, who in turn has been succeeded by **L. F. Peterson,** transferred from Tulsa. **Lewis Finch, Jr.,** petroleum engineer in the Fort Worth office, has been moved to the North Cowden area as field engineer, with **W. O. Keller** transferred to Fort Worth from Odessa to succeed him. **W. M. Elias,** former field engineer at North Cowden, was shifted to Tulsa as division industrial relations manager for Kansas and Oklahoma.

C. B. Carruthers, petroleum engineer at Fort Worth, was transferred to Tulsa. **J. E. Wooten,** assistant field superintendent in East Texas, was shifted to Tulsa as district superintendent for Kansas and Illinois, replacing **J. L. Nichols,** district superintendent, who was named industrial relations manager for the Rocky Mountain division with headquarters at Casper, Wyo. **Clyde Nichols** was shifted from Odessa to East Texas as assistant field superintendent, replacing Mr. Wooten, while **Vance Sibley** was shifted from Brownfield to Odessa, succeeding Mr. Nichols.

H. D. ARMSTRONG

Herbert D. Armstrong, formerly with the Federal Reserve Bank of San Francisco, has been elected assistant treasurer of Standard Oil Co. of California. He took his new post August 16, filling the position recently vacated by **H. C. Judd,** now treasurer of the company. In 1939 Mr. Armstrong became head of the discount and credit department of the Federal Reserve Bank. When evacuation of Japanese residents in San Francisco took place in 1942 he was made head of the evacuee property department of the bank.

Harold W. Roome has been appointed production foreman for Pure Oil Co. in the Louise district, Texas Gulf Coast and **Albin E. Bezdek** has been made chief gager in the Ganado (Texas) area.

William Robertson, who has been drilling foreman for Texas Co. in Los Angeles Basin for some time, was recently transferred to the coastal district with headquarters at Ventura, Calif.

W. H. Geis, assistant to the president of Union Oil Co. who has maintained offices in Washington, D. C., for the past year, was in Los Angeles, Calif., last week on a business trip.

H. J. Kemler, general manager of the West Texas and New Mexico division of Shell Oil Co., Inc., has been promoted to production manager for the

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company in charge of its activities in Louisiana, Arkansas, Mississippi, New Mexico, and Texas, with headquarters at Houston, Tex. Mr. Kemler has been in charge of the West Texas and New Mexico division for more than 5 years

C. P. MILLER

Charles P. Miller, assistant engineer to **Glenn Staley,** Lea County, New Mexico, proration officer, at Hobbs, N. M., will retire from that position September 1 and accept cooperative engineering work in the West Texas Permian basin, Lea and Eddy counties, New Mexico, for a group of independent operators. Previously he was in the engineering and geological department of the Texas Co., at Denver, Colo., and assistant district geologist for Gulf Oil Corp., at Roswell, N. M.

Shifts: **W. H. Barber,** superintendent, Humble Oil & Refining Co., Ingleside to Baytown, Tex.; **E. H. Almond,** engineer, Hanlon Gasoline Corp. of Texas, Gladewater to McLean, Tex.; **H. Giddings,** geologist, Texas Co., Midland to Wichita Falls, Tex.; **R. W. Blackburn,** engineer, Continental Oil Co., Ville Platte, La., to Lusk, Wyo.; **R. G. Hubman,** geologist, Texas Co., Wheeling, W. Va., to St. Clairsville, Ohio.

Troy Stalls, Stanolind Oil Purchasing Co.'s representative at Wichita Falls, Tex., has been transferred to Midland, Tex., where he will represent the company in the West Texas-New Mexico area. Succeeding Mr. Stalls as representative in the North Texas area is **James C. Mytinger, Jr.**

Guy H. Woodward, attorney at Tulsa for a number of years for the Stanolind companies, has resigned and on September 1 will join Sen. Ed Moore in Washington as research counsel on the senator's staff.

Vilas Sheldon, petroleum engineer in the Fort Worth, Tex., division of Stanolind Oil & Gas Co., has resigned to open a petroleum engineering consultant office at Artesia, N. M. He will be associated with **C. A. Aston,** of Loco Hills, N. M., in the firm. Mr. Sheldon had been with Stanolind for 9 years.

Paul A. Henshaw, former oil operator in Fort Worth and San Angelo, Tex., and Mattoon, Ill., and now a captain in the Army Air Forces, assigned to Ellington Field, Houston, Tex., has assumed command of the 71st Twin-Engine Flying Training Squadron. Captain Henshaw received his commission in June 1942, and for the past 9 months has been stationed at Ellington Field.

Maj. M. T. Halbouty, consulting engineer in Houston, Tex., when he entered active miliary service in February 1942, has been transferred from Fort Benning, Georgia, where he was instructor in the infantry school, to the office of the Quartermaster General, Fuels and Lubricants Division, in Washington, D. C., where he is chief of the field estimates section, requirements branch.

William H. Hawn, independent geologist in Corpus Christi, Tex., when he was accepted as an aviation cadet at San Antonio last May, has completed his basic flying training at Gardner Field, California, has been sent to an advanced school to finish his pilot training.

H. L. Patterson, Pure Oil Co. production department employe who recently completed a 3-year assignment in Venezuela, has been made district superintendent for the Van joint-account operations in the Van field, East Texas.

Bob Whitty, on the staff of Canadian Oil Co. refinery at Petrolia, Ont., since his return from overseas' service a few months ago, has left for Fort McMurray, Alta., where he will take part in the experimental tar sands operations for the federal government under the supervision of **E. A. Smith.**

Chase E. Sutton, general manager of Pure Oil Co.'s Gulf Coast producing division, was the speaker at the meeting in Houston, Tex., last week of the Gulf Coast section of the A.I.M.E. Mr. Sutton is chairman of the PAW District 3 subcommittee on joint use of facilities and reclamation

Charles Edward Shipe, formerly consulting technologist in the refining department of Texas Co., Houston, Tex., and now in the chemical warfare service in Australia, was recently promoted from captain to major. Major Shipe graduated in chemical engineering from New Mexico A. and M. College and did graduate work at that institution. As a member of the Officers Reserve Corps he was called to active service in the Army a year before Pearl Harbor.

Discussing Information Please on Wartime Plant Protection at the last monthly meeting of the California Natural Gasoline Association were **M. L. Arnold,** of Richfield Oil Corp.; **Stanley Clithero,** General Petroleum Corp.; **Glenn Hile,** Standard Oil Co. and **J. B. Taylor** of Signal Oil & Gas Co.

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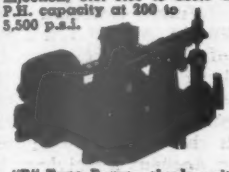

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Rotary Drilling Handbook Third Edition 1942—by J. E. Brantly	5.00
Chemical Engineer's Handbook Second Edition, 1942—by John H. Perry	10.00
The Reactions of Pure Hydrocarbons by Gustav Egloff	16.75
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Tulsa, Oklahoma

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Market Developments

East Coast

NEW YORK.—The belief voiced here several weeks ago that the pleasure-driving ban would not be lifted until after the benefits from the completion of the big-inch line were felt was apparently confirmed late last week when simultaneous statements were issued by OPA PAW and ODT indicating that the ban would not be revoked before September 1. Acting OPA head Mr. Bowles saw possible lifting of the ban then; Mr. Ickes, of PAW, said that it would take several weeks to realize the effect of reduced ration values in the Midwest and Southwest upon which relaxation of the ban in the East depended, and Mr. Eastman, ODT director, stated that additional volumes of gasoline entering District 1 would be restricted for the use of curtailed bus operators .

The second consecutive minor decline in the East Coast supply index provided ample evidence that reports of an earlier relaxation of the ban were premature. The second reduction in the index in a period when it should be rising dropped it to 34.7 in contrast to 54.5 a year ago, thus indicating that stocks of that last date it was issued were 36 per cent lower than they were 12 months before. In order to insure against heating-oil shortages in the coming winter, the index should rise to 50 before restrictions are relaxed. This would require an approximate 50 per cent increase in existing stocks available for civilian consumption.

Even though the ban has not been revoked, a large increase in pleasure driving has been noted in the eastern area. This has been a contributing factor to the decline in the supply index though the principal factor has been adverse weather conditions that have curtailed rail operation. When these conditions return to normal and the big-inch line is in full operation, the index is expected to spurt upward and provide the necessary justification for relaxation of present restrictions.

Mid-Continent

MOVEMENT of gasoline into hands of consumers over last week end hit a new peak for the current season as motorists took advantage of the 48-hour notice of a cut in the value of gasoline coupons for the Middle West and Southwest. Bulk terminals and retail outlets were virtually stripped of gasoline before the buying wave subsided at midnight August 15.

Previously, refiners had adopted involuntary rationing methods of their own in an effort to stretch limited supplies over the requirements of all contract customers. Under the pressure to meet rising demand, buyers practically ignored price ranges on products and accepted quotations at the top of the scale without question.

Ceiling prices established by government regulation have tended to become the prevailing trade prices, since fewer and fewer suppliers have been willing to sell for less than the maximum figures available to them.

With buying pressure thus dominant in the refinery market and with buyers willing to pay any reasonable figure, yet with prices stopped at the ceiling, the effect is to establish virtually a single price on most or perhaps virtually all products.

All products, gasoline, fuel oils and related products, were extremely strong in the refinery market.

Gulf Coast

HOUSTON, Tex. — With all restrictions on refinery crude runs removed by the PAW, plant managers in the Gulf Coast territory are trying hard to bring output of products closer to the level of demand. August crude runs for District 3 were fixed by the PAW at 1,410,000 bbl. daily, unchanged from July, with refiners authorized to run any additional crude which they could get for themselves from Southwest Texas, West Texas, or New Mexico. Following the recent coastal hurricane, which damaged many plants, all limitations were withdrawn to compensate so far as possible for the reduced production caused by the storm.

Inventories continue the decline which began last April. Stocks of all products held by members of the Gulf Coast Refiners Association totaled 3,197,398 bbl. August 1, a downward slide of 145,142 bbl. from the 3,342,540 bbl. in storage July 15. All grades of gasoline were 1,744,625 bbl., compared with 1,791,568 bbl. on July 15. Although this is a drop of only 46,943 bbl., it deepens misgivings because for months the gasoline in tanks has not represented even comfortable working stocks.

Kerosene remained acutely tight, though buyers said it was not quite so hard to get as gasoline. Reports on stocks showed there had been negligible change from the mid-July figures. This was true also of diesel fuel oil. Combined stocks of diesel gas oil and No. 2 burning oils held by members of the Gulf Coast Refiners Association fell from 748,679 bbl. on July 15 to 622,993 bbl. on August 1. Bunker C fuel oil continued to buck the trend and stocks rose in the second 2 weeks of July from 82,048 bbl. to 196,976 bbl.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week ended August 7, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	136	1,899	588	1,067
Ind., Ill., Ky.	713	14,607	3,297	5,643
Okla., Kan., Mo.	320	6,004	1,696	2,111
Censored area*	1,766	30,185	14,392	15,161
Rockies	90	1,523	676	360
Total 8- 7-43	3,776	73,368	66,714	36,344
Total 7-31-43	3,788	74,977	66,877	36,383
Total 8- 8-42	3,574	79,559	78,316	39,372

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
August 7, 1943	237,382,000
July 31, 1943	238,420,000
August 8, 1942	246,975,000

*Excludes unrefinable California stocks.

Pacific Coast

LOS ANGELES, Calif. — California markets are devoid of price changes and the volume of trading is negligible.

Fuel-oil demand continues firm, however, and liftings have been above average but at contract prices.

Natural gasoline, owing to the high demand for butane and isobutane, has become tight and there is a marked shortage with no relief in sight. Usually such a condition would result in higher prices but in this instance those who have stocks are holding on and attempting to maintain inventories for future use. In the over-all picture, however, there is very little available at any price.

Mohawk Petroleum Co., at Bakersfield, Wilshire Oil Co. at Norwalk and others are concentrating their efforts toward the production of aviation gasoline and providing charging stock for butadiene production. This concentration of operations has resulted in a contraction in the number of marketers competing in retail trade. There is also a noticeable trend toward the production of premium grades of gasoline.

Refinery Prices

(Prices as of August 17)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	‡5.750-6.250	‡5.750-6.250	‡5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	.....	6.000-6.125	5.500-6.000	.....

*Basis Group 3 †1939 C.F.R. (research method). ‡Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C§
Mid Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‡1.10-1.15
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200 210 D, 10-25	27.00
150 160 D, 0-10	23.00
120 125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00 9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point	30.50
15 pour point	29.50
25 pour point	25.00 28.00
Steam refined:	
600	15.00 16.00
650	15.50 16.50
600 flash	16.00 17.50
650 flash	17.00 17.50

Neutral Oil

(Vis at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
300-3	15.00
350-3	18.00
500 3	19.50
600 3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils

Neutral Oils

CALIFORNIA—

Pale oils:

200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:

200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00

200 vis. at 70° F., 3 color:

Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in oags fully refined:	
130-132 (A.m.p.) wax	5.000
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10 50
Boston, Mass.	14.90	4.50	10 10
Burlington, Vt.	16.90	5.50	10 30
Buffalo, N. Y.	16.20	5.50	10 00
Dover, Del.	16.70	5.50	12 30
Hartford, Conn.	15.60	4.50	10 00
Manchester, N. H.	17.30	5.50	12 10
Newark, N. J.	15.20	4.50	10 00
New York, N. Y.	16.10	5.50	10 10
Philadelphia, Pa.	16.20	5.50	11 00
Pittsburgh, Pa.	16.70	5.50	12 30
Portland, Me.	16.30	5.50	10 20
Providence, R. I.	15.00	4.50	9 90
Washington, D. C.	15.20	4.50	11 30
Average 14 cities	16.02	5.14	10 60

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill.	13.40	4.50	10.6
Cleveland, Ohio	15.00	5.50	*9 90
Dallas, Tex.	13.00	5.50	7 00
Des Moines, Iowa	14.40	4.50	10.1
Detroit, Mich.	14.40	4.50	10.0
Fargo, N. D.	16.90	5.50	11.6
Huron, S. D.	16.30	5.50	11.0
Indianapolis, Ind.	15.20	5.50	10.1
Little Rock, Ark.	17.50	8 00	10 00
Milwaukee, Wis	16.10	5.50	10.8
Minneapolis, Minn.	15.9	5.50	10.6
Omaha, Neb.	15.40	6 50	9 90
Tulsa, Okla.	16.50	7.00	8 50
Wichita, Kans.	12.70	4.50	8.3
Average 14 cities	15.19	5.57	9.04

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag
Atlanta, Ga.	18.90	7.50	†11 50
Birmingham, Ala.	18.50	8.50	9 90
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13 30
Charlotte, N. C.	20.10	7.50	11 30
Jacksonville, Fla.	18.90	8.50	9 50
Jackson, Miss.	17.50	7.50	10 00
Louisville, Ky.	16.50	6.50	8 50
Memphis, Tenn.	17.90	8.50	10 50
New Orleans, La.	17.75	8.50	*10 00
Norfolk, Va.	17.45	6.50	12 30
Average 11 cities	18.34	7.50	10 40

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Albuquerque, N. M.	17.50	7.50	10 00
Boise, Idaho	20.10	6.50	16 50
Casper, Wyo.	17.00	5.50	12 00
Denver, Colo.	14.50	5.50	11 00
Helena, Mont.	17.00	6.50	13 00
Phoenix, Ariz.	18.50	6.50	12 50
Reno, Nev.	17.50	5.50	13 50
Salt Lake, Utah	18.50	6.50	14 50
Average 8 cities	17.58	6.25	12 50

PACIFIC COAST

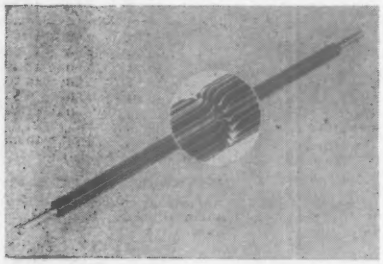
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag
Portland, Ore.	17.00	6.50	13.00
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.00
Average 3 cities	16.17	5.83	13.83
Average 50 cities	16.55	5.96	10 80

Equipment Progress

Cut and Twisted Fintubes Increase Heat Duty

Brown Fintube Co., Elyria, Ohio, manufacturers of Brown resistance-welded, integrally bonded fintubes—1 lineal foot of which is said to pro-



vide the heat transferring capacity of from 6 to 10 ft. of plain bare tubes—resulting in very substantial savings in heat exchanger shell sizes, weights, pressure drops, and in manufacturing, shipping and installation costs, when effecting heat transfers between commodities having unequal heat transfer coefficients, has now added "cut and twisted" fintubes to its line.

This new development, according to the company, consists of taking standard types of Brown "longitudinal" fintubes, cutting the fins transversely at desired intervals, and twisting the ends, see the illustration above.

This cut and twist is said to produce much greater turbulency of the shell side commodity than when straight untwisted fins are used—and produces increased thermal efficiencies ranging up to 50 per cent in sectional hairpin and other types of heat exchangers in which the shell side commodity is held closely against the fintube, resulting in still further savings in weight, pressure drop, shipping, etc.

New Raw Material for Synthetic Elastomers

A new raw material which is said to offer interesting possibilities in the development of synthetic elastomers has been made available by Reilly Tar & Chemical Corp., of Indianapolis, Ind. The new chemical, developed in the Reilly Laboratories, research division of the Reilly organization, is 2-vinylpyridine, which is the pyridine analog of styrene.

According of Reilly chemists, 2-vinylpyridine copolymerizes similarly with butadiene and styrene, and with butadiene and styrene together, to form a synthetic elastomer which is said by rubber experts to have very interesting properties. The material boils at 159° C. (760 mm.) and can be distilled at about 98° C. at 100 mm. It is soluble to the extent of about 2.5 per cent in water and is readily emulsified with water, about 15 per cent of the water dissolving in it.

Synthetic Hose and Connections Need No Reinforcement or Cover

Tougher, more resistant, and yet more economical to manufacture—these are the advantages claimed for a hycar synthetic-rubber hose.

According to Hycar Chemical Co. of Akron, this hose will stand up under long and hard usage carrying petroleum products and other solvents in low-pressure service. The hycar hose can be made in one operation by the extrusion method in lengths as long as desired. The costly process of wrapping and covering the tube would not be necessary.

For gravity and low-pressure feeds of petroleum products, this high oil-resistant synthetic could solve many formerly perplexing problems. It is little affected by temperatures as low as 70° F. below zero and does not crack or disintegrate under intense sunlight or heat. For flexible couplings on oil or other solvent-carrying lines it offers ideal applications.

Moore Appoints Ensign Eastern Division Manager

Lee C. Moore & Co., Inc., have announced the appointment of Lloyd G. Ensign as general manager of the company's eastern division, to take effect immediately. Mr. Ensign will make his headquarters at the administrative offices in Pittsburgh, Pa.

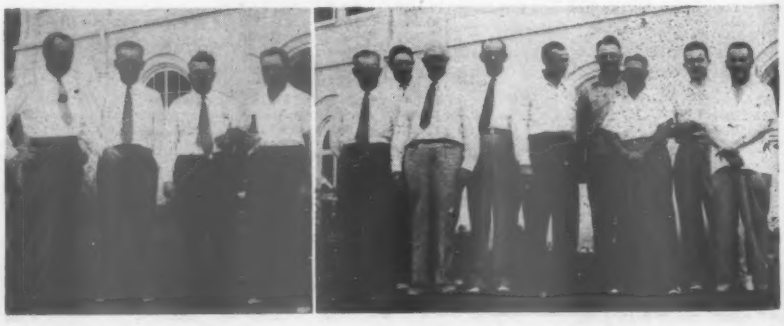
Prior to this appointment, Mr. Ensign has been with the cmopany for the past 5 years as export manager and New York representative at 30 Rockefeller Plaza, New York. The New York office will be maintained and the activities will continue under Mr. Ensign's direction in addition to his new duties.

Stratford Engineering Corp., 1414 Dierks Building, Kansas City, Mo.—Service Bulletin 270, on Stratco alkylation equipment. The bulletin has been prepared from the standpoint of service rather than from sales and the actual technology of alkylation is not covered.

HOUSTON NOMADS GOLF, EAT BARBECUE

The Houston chapter of Nomads recently held their annual golf tournament and barbecue. At left is H. E. Estes, Reed Roller Bit Co., new assistant secretary and treasurer.

Below, le't: Charlie Fontaine, Reed Roller Bit Co.; Grover Simpson, Lofland Brothers; C. C. Brown, Brown Oil Tools, and K. B. Knox, Petroleum Well Servicing Co. Below, right: Mr. Simpson; Red Early, J. S. Abercrombie Co.; T. J. Lewis; George Tyson, Jones & Laughlin; John Sides, Hughes Tool Co.; Arch Owens, Dailey-Owens Tool Co.; J. M. O'Melveney, Patterson-Ballagh; Madden Works, Cameron Iron Works, and Robert J. Miller, National Supply Co.



Classified Advertising

EQUIPMENT FOR SALE

1—Type F.C.O.C.S. Reverse Clutch complete with 56" 10 groove V belt pulley mounted on 16" steel skids. 1—2 ton Yale chain hoist. 2000' 4½" O.D. Drill pipe. C. V. Phillips, 403 Crescent, Hutchinson, Kansas.

STEEL Tanks all sizes, some containing pipes and coils, originally used for refrigeration, also electric and steam pumps. Capital Ice Company, Indianapolis, Indiana.

FOR SALE: 8000' of Special I Fence, 58" high. Double line wire every 4 inches up and down. $2.50 per rod. Steel Posts, 70c each. Wire and posts in new condition. THE HARPER PETROLEUM CORPORATION, Bryson, Texas.

FOR SALE: Pressure Storage Tanks, total capacity, 5,766 barrels, sizes 10' x 40' down to 4' x 10'; also miscellaneous engines, compressors, valves and fittings. Arab Gasoline Corp., P. O. Box 709, Eastland, Texas.

FOR SALE—1—14 x 12 Gardner-Denver Twin Cylinder-Piston Valve Type Roller bearing complete enclosed oil bath—steam engine mounted on 12 x 12 H Beam steel skids with necessary cross members and braces 20 feet long with National steam separator and trap-force feed oil pump and 6" Badgett steam lubricator for dual oil system — 3" Brown throttle valve — 22 tooth dual drive split sprocket for 1240 double chain. All the above mounted in unit and completely piped and fitted for steam connection.

2—12 x 12 Oil Well Supply Twin Cylinder Steam Engines mounted—fitted and equipped as above—Approximate HP 750.

None of these engines need overhauling or repairs. They are ready to go.

1—OWS 9 x 9 x 9 Drawworks unit with hydromatic brake, double engine drive water cooled drum complete with guards and chains.

1—400 ton 8" Ideco swivel complete w/gooseneck and left hand bottom connections.

Other drilling equipment, also 3½ and 4½ O.D. Drill Pipe for sale. F. H. BROWN. P. O. Box 331, Carmi, Illinois.

FOR SALE: Oil refinery equipment including high and low pressure valves, gages, also two new Caterpillar D-2 tractors equipped with La Plant Choate hydraulic Dozers. List of items sent to interested buyers on request. HARVEY BROTHERS. Parkdale Colorado.

FOR SALE

One Watts-Miller Improved 50 HP Air Compressor, first-class condition. Ideal setup for repressuring partially depleted sands.

H. S. MOSS
1503 First Nat'l Bank Bldg.
Dallas 1, Texas

DIESEL ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—also boilers, steam engines, turbo generators.

Complete Information on Request

A. G. SCHOONMAKER COMPANY
45 Church Street New York, N. Y.
Phone—WOrth 2-5455

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

LEASES AND DRILLING BLOCKS

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot, 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

LARGE Independent Oil Company having Geological and Geophysical department has several outstanding, approved drilling blocks which would farm out on fair basis to responsible parties. P.O. Box 1914, Fort Worth, Texas.

WILL pay cash wells shallow production or wells to be salvaged. Will also lease. Give production, location, etc. Box B-745, The Oil and Gas Journal, Tulsa, Okla.

FOR Drilling Blocks, and leases, and royalties in Wood, Franklin and Hopkins counties, Texas—see
W. B. WORTHEN
P. O. Box 84 Winnsboro, Texas
Phone 228

NEW 89-acre lease, ¾ mile from production, Shelby County, Texas, two other wells to start soon. $3.50 per acre. Excellent buy! Four Thousand acre drilling block on good structure. Write C. A. Parker, Box 451, Center, Texas, for information.

HAVE 10,000 acre block in western Canada wildcat acreage, good geology, 3,500' maximum depth. Wish to contact experienced drillers with own equipment. Will make liberal contract and assist in financing the operations. Box B-758, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: An ideal flooding proposition. 34 wells 200 feet deep equipped for pumping, with ten intake wells already drilled and cemented to sand. Oil 34 gravity. Pipe line connections. Plenty of suitable water available. Property must be sold. Address: W. H. Robins, Owner, 4526 West Broadway, Muskogee, Okla.

FOR SALE: New state oil and gas leases, Lea, Eddy and San Juan counties, New Mexico. Easy payments—free map and circulars. Wm. C. Uphoff, Box 703, Peoria, Ill.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

BUSINESS OPPORTUNITIES

AS A HEDGE AGAINST INFLATION would you like to mine: copper? lead? zinc? silver? gold? If so, please write me what you want. Maybe I can supply it. Guy L. V. Emerson, Midland Savings Bldg., Denver, Colo.

OIL MUD SCREENS
The manufacturer of well-known equipment of proven efficiency for industrial uses of similar characteristics now operating at capacity willing to grant license on reasonable royalty or lump-sum basis to established manufacturer of oil-field equipment for manufacture, use, and sale in that field of modifications specially adapted to particular purpose. Shop drawings and other manufacturing information available will minimize if not eliminate usual development expense. Box B-752, The Oil and Gas Journal. Tulsa. Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

EXPLORATION

EVERY WELL A PRODUCER

Any oil or gas deposits worth while, that come within 6 miles of these two scientific instruments can be detected, and will lead you straight to them. I will tell you how many sands, whether salicious or above and about what may be expected of each. Check the domes and keep you over the main gas or oil deposits.

Uncle Sam needs more oil and gas, let's get it for him.

Write for particulars.

DR. K. W. FIELDER
154 North Main St.
Wichita 2, Kansas

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity —	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80			
19-19.9	84		$1.06	$0.70
20-20.9	86	$0.85	1.08	73
21-21.9	92	87	1.10	74
22-22.9	96	89	1.12	76
23-23.9	1.00	91	1.14	78
24-24.9	1.03	93	1.16	80
25-25.9	1.07	95	1.18	83
26-26.9	1.11	97	1.20	84
27-27.9	1.15	.99	1.22	86
28-28.9	1.18	1.01	1.24	88
29-29.9	1.20	1.03	1.26	90
30-30.9	1.23	1.05	1.28	92
31-31.9		1.07	1.30	94
32-32.9		1.09	1.32	96
33-33.9		1.11	1.34	98
34-34.9		1.13	1.36	1.00
35-35.9		1.15	1.38	1.02
36-36.9		1.17	1.40	1.04
37-37.9		1.19	1.42	1.06
38-38.9		1.21	1.44	1.08
39-39.9		1.23	1.46	1.10
40 and above		1.25	1.48	1.12

*Includes Lea County, New Mexico

LEGAL

LEASE OF OIL AND GAS PRIVILEGES ON STATE REFORESTATION AREA LANDS, STEUBEN AND SCHUYLER COUNTIES.

Sealed bids for the leasing of the right to prospect, extract, pipe, store and remove oil and natural gas from 1698.69 acres of State reforestation area lands in Steuben and Schuyler Counties, more particularly described as Steuben Reforestation Area #3, Proposals A, B, C, D, E, F, G, H, I, L, N, O, P, U, S, T, and Schuyler Reforestation Area #1, Proposal J, located in the Towns of Bradford, Steuben County, and Orange, Schuyler County, will be received at the office of the Conservation Commissioner, 488 Broadway, Albany, N. Y., until 2:30 PM Eastern War Time on September 1, 1943.

Bids must be submitted in sealed envelopes endorsed on the outside with the name of the bidder and the following: "Proposal for oil and gas privileges on State lands in Steuben and Schuyler Counties, N. Y., to be opened at 2:30 PM E.W.T. September 1, 1943."

These privileges will be leased to the highest bidder in accordance with the terms of Section 60-b of the Conservation Law and of the standard oil and gas lease of the State of New York. Copies of this lease will be furnished to prospective bidders upon application. Official maps of the Conservation Department showing the location of the lands to be leased may be seen at the office of the Conservation Department, 488 Broadway, Albany, and at the office of District Forester I. S. Bowlby, 34 Liberty St., Bath, N. Y.

Bidding for these privileges will be upon the royalty per thousand feet for gas, in addition to which an annual rental of $1,000 will be required and also one-eighth of the market value of any oil produced. Bids must be accompanied by a certified check or cash deposit in the amount of the annual rental, which will be credited to the successful bidder upon execution of the lease. Deposits of unsuccessful bidders will be returned. Successful bidders will be required to give a bond of $5,000 for faithful performance of the terms of the contract. The Conservation Department reserves the right to reject any and all bids.

Allen Corp., The ... 83
American Bosch Corporation ... 14
American Meter Company ... 28
Arkansas Fuel Oil Co. ... 103
Armstrong Machine Works ... 100
Associated Piping & Engineering Co., Inc. ... 83
Bantam Bearings Div. The Torrington Co. ... 4
Bethlehem Supply Company ... 1
Brown-Strauss Corp. ... 83
Bruning Co., Inc., Charles ... 98
Buda Co., The ... 95
Cameron Iron Works, Inc. ... 23
Chicago Bridge & Iron Company ... 21
Cities Service Oil Co. ... 103
Classified Advertising ... 117-118-119
Cleveland Trencher Company ... 87
Cooper, Fred E. ... 27
Cooper-Bessemer Corp., The ... 46-47
Coppus Engineering Corp. ... 3
Crane Co. ... 5
Dayton Rubber Mfg. Co., The ... 26
Fluor Corporation, Ltd., The ... 9
Foxboro Mfg. Co., The ... 2
General Electric ... 58
General Electronic Industries Div. Auto-Ordnance Corp. ... 79
Geophysical Service, Inc. ... 30
Globe Steel Tubes Company ... 17
Gott Mfg. Co., H. P. ... 103
Goulds Pumps, Inc. ... 99
Graver Tank & Mfg. Co., Inc. ... 74
Gray Tool Co. ... 18
Happy Company, The ... 54

ADVERTISERS IN THIS ISSUE

Halliburton Oil Well Cementing Co. ... Inside Front Cover
Harrisburg Steel Corporation ... 97
Hazard Wire Rope Division of American Chain & Cable Co., Inc. ... Inside Back Cover
Hills-McCanna Co. ... 113
Hughes Tool Co. ... Back Cover
Hunt Tool Company ... 6
Industrial Engineering Co. ... 87
Jones & Laughlin Steel Corporation ... 12
Kennedy Valve Mfg. Co., The ... 104
Laughlin Co., The Thomas ... 92
Layne & Bowler, Inc. ... 98
Leschen & Sons Rope Co., A. ... 57
Leyman Manufacturing Corp. ... 104
Link-Belt Company ... 13
Ludlow Valve Mfg. Co., The ... 99
Lunkenheimer Co., The ... 25
McCord Radiator & Mfg. Co. ... 82
Mayfair Hotel ... 106
Merco Nordstrom Valve Co. ... 68A-68B
National Airoil Burner Co., Inc. ... 95
National Supply Co., The ... 80-81
New Bedford Cordage Co. ... 109
Norton Company ... 22
Oil Well Improvements Co. ... 112
Oil Well Supply Co. ... 85
Patterson-Ballagh Corporation ... 100
Petroleum Electric Power Association ... 96
Petroleum Industry War Council ... 20
Petroleum Rectifying Company ... 94
Powell Co., The William ... 72
Price Co., H. C. ... 97
Rector Well Equipment Co., Inc. ... 100
Reed Roller Bit Company ... 84
Refinery Supply Co., The ... 71
Republic Flow Meters Co. ... 97
Roebling's Sons Company, John A. ... 9
Rollway Bearing Co., Inc. ... 10
Sharman and Allen ... 97
Shell Development Co. ... 15
Smith Meter Co. ... 113
Spicer Mfg. Co. ... 11
Sterling Machinery Corp. ... 83
Stoody Co. ... 82-86-100
Talon, Inc. ... 83
Texas Electric Steel Casting Co. ... 110
Thermoid Company ... 91
Timken-Detroit Axle Co. ... 19
Timken Roller Bearing Company ... Front Cover
United States Rubber Company ... 8
Universal Oil Products Co. ... 4th
Vinson Supply Co. ... 107
Vulcan Steel Tank Corp. ... 71
Webster Engineering Co., The ... 101
Wheatley Pump & Valve Mfr., Frank ... 91
W-K-M Company, Inc. ... 81
Worthington Pump & Machinery Corporation, Refrigeration & Air Conditioning Div. ... 15
Youngstown Sheet & Tube Co. ... 4th

Journalisms:

IN the Ranger, Tex., district, natural gasoline from six plants is delivered by truck and pipe line to a central plant which, except for three large towers and incidental minor equipment, was constructed entirely from used materials. Despite the variation in the composition of the charge stock from the different plants, the central plant has been set up in such a way that uniform products are obtained. How this is accomplished is the subject of a staff article in next week's Engineering and Operating Section.

OIL fires are started in many ways and under many different conditions. Fighting each type of fire involves different techniques and it is therefore necessary to exchange experience in fighting all types of fire if organizations for this purpose are to be effectively operated. Recently, the Great Lakes Region Committee of the National Committee on Protection of Petroleum Facilities, under the chairmanship of L. S. Wescoat, vice president, Pure Oil Co., conducted a school in the East Chicago area at which demonstrations and lectures on fire fighting were presented to over 400 men. The principles demonstrated at this school will be outlined in an article scheduled for next week's Journal.

RIVER crossings on the eastern half of the big-inch line offered many problems because of the variable topography encountered. They included normal river crossings, trenching across rock river bottoms where the work might be complicated by nearby highways, railroads and canals, crossing a steep gorge where 45° bends had to be made on each side and other complications. The Journal's pipe-line editor inspected the work at many of these crossings and what he found out about methods and practices will be presented next week.

A LARGE oil company has long been carefully studying the joint use of facilities in its natural-gasoline plant operations, in order to conserve manpower and critical materials. Eventually, the company's engineers effected a consolidation of two plants located in adjacent fields. A minimum cash outlay was necessary, since existing equipment, and equipment reclaimed from other properties, was utilized throughout. With the consolidation has come a residue gas surplus in place of a shortage that existed for the past several years. An article that will give the details of this important conservation move has been prepared by a member of the Journal's staff, and will appear in an early issue.

CALENDAR

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place not yet determined.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf-Astoria Hotel, New York City, September 21-22.

October

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS, third annual meeting, Houston, Tex., October 5-6.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 14-15.

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Table of Contents

NEWS DEVELOPMENTS

Ickes and DeGolyer Will Head Petroleum Reserve Corp. 44
Late Reports Reveal Heavy Damage to Rumanian Plants ... 45
Interpretations Bring Changes in Labor-Law Applications... 46
Paloma Recycling Plant Will Have 50,000,000-cu.-ft. Capacity 48
WPB Assigns PAW Broader Authority in Materials Control.. 50
Texas Commission Surveys Possibility of More Production... 52
Texas Discovery, Extension Wells Given High Allowables.... 53
Ten Thousand Women Employed in Oil Refineries 54
Senators Hear Testimony on Synthetic Liquid-Fuel Operations 55
Petroleum Specialty Protects Lafayette's Machinery 56

Trends 43
This Week 47
Editorial 51
Federal Order Digest 54
Natural-Gas News 101
Natural-Gasoline News .. 101
Refining News 102
Pipe-Line News 104

ENGINEERING—OPERATING

PIWC Fire School Gives Vital Wartime Protective Training . 57
WEP River Crossings 63
Oil-Well Pumping Practices—No. 9 66
Straightener Press Built From Old Lathe Bed 70
Central Fractionator Concentrates Special Products 74

Operating Ideas 73
Book Review 81
Questions on Technology . 83
Cost Engineering 93
Engineering Fundamentals 95
Journalog 99

EXPLORATION AND DRILLING

Week's Highlights 107
Completions in All Fields 107
Daily Average Production for Week 108
Completions by Areas Start on Page 108

ADDITIONAL FEATURES

Drilling Contractors 130
Personals 133
Market Developments ... 136
Refinery Prices 137
Tank-Wagon Prices 137
Equipment Progress 139
Classified Advertising ... 141
Calendar of Events 144
Journalisms 144
Advertisers' Index 144

General Heading: **BAKER ROTARY WALL SCRAPER and BAKER ROTARY WALL SAMPLER**

BAKER OIL TOOLS, INC.
Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Tex.
Export Sales Office:
19 Rector Street, New York, N. Y.

Unit No. **A-25**

Subject: **Cleaning Up Face of Producing Zone**

Index: 250.1
Date: Aug. 26, 1943
Page: 1

The Baker Rotary Wall Scraper provides a safe, efficient means of enlarging the walls of an open hole to a diameter considerably larger than that of the casing through which it is run. Furthermore, the enlargement may be performed at any desired point in the open hole.

The practical field applications that can be performed with this tool are many and varied. One popular application, "Cleaning Up Face of Producing Zone" is illustrated below:

REMARKABLE REAMING CAPACITY:

One of the outstanding features of this versatile tool is its remarkable reaming capacity in relation to its over-all dimensions. Tremendous strength resulting from correct design and the use of alloy steels, makes it possible to run the Baker Wall Scraper through casing of comparatively small size, then expand the blades and scrape the open hole below the casing to a large diameter.

SIMPLICITY OF USE AND OPERATION:

The Baker Wall Scraper is practically fool-proof. It is constructed of a minimum number of essential parts and any experienced driller can operate the tool without difficulty and with assurance of satisfactory results.

Product No. 500
Fig. 1 — Baker Rotary Wall Scraper.

IMPORTANT APPLICATIONS:

Enlarging Holes for Casing

Cleaning Up Oil Sands

Setting Liners

Setting Cement Plugs

Bottlenecking for Cement Jobs

Removable Sections of Drillable Pipe

Enlarging Holes for Gravel Packing

Water-Shut-Off Tests

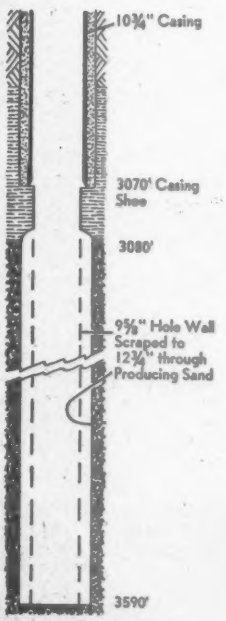


Fig. 2—Scraping Face of Oil Sand and Enlarging Bore of Producing Zone for Maximum Recovery.

. . . and the BAKER ROTARY WALL SCRAPER is really TWO TOOLS in one

By merely substituting Sampler Blades for the regular Wall Scraper Blades, this tool is converted into a Baker Wall Sampler. With the latter device, actual cores can be taken from the side wall of any uncased hole. Here is "double value" for your money.

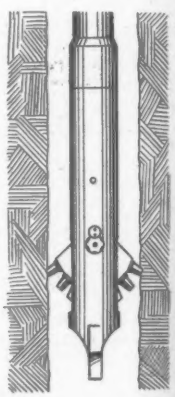
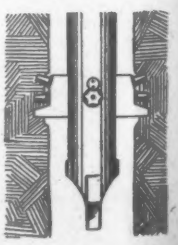


Fig. 3—Wall Sampler in Operation. Showing Blades Opening and Causing Core Tubes to Contact Wall of Hole.

Fig. 4—Tubes Forced into Wall of Hole and Filled with Sample of Formation.



SEND FOR BAKER BROADCAST NO. 19 . . .

This is a 40-page illustrated treatise giving complete details on the many practical field applications for the Baker Rotary Wall Scraper and Wall Sampler.

Service Note— Competent Baker men will advise, make suggestions, and otherwise assist in securing best possible results.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 108

CRUDE PRODUCTION 4,224,285 bbl. daily average—down 34,300 bbl. One year ago 3,952,250 bbl.

CRUDE STOCKS 236,520,000 bbl. as of Aug. 14—down 862,000 bbl. One year ago 246,433,000 bbl.

GASOLINE STOCKS 72,505,000 bbl. as of Aug. 14—down 863,000 bbl. One year ago 79,190,000 bbl.

RESIDUAL FUEL-OIL STOCK 66,448,000 bbl. as of Aug. 14—down 266,000. One year ago 77,368,000 bbl.

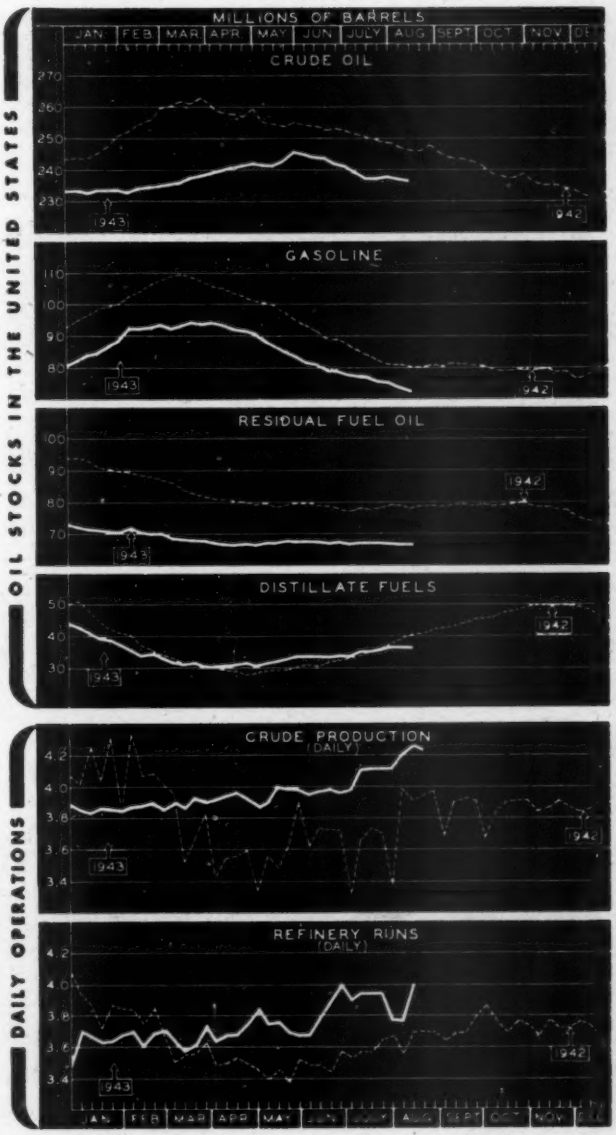
GAS OIL AND DISTILLATES 36,574,000 bbl. as of Aug. 14—up 230,000 bbl. One year ago 40,499,000 bbl.

REFINERY RUNS 4,004,000 bbl. daily week ended August 14—up 228,000. One year ago 3,724,000 bbl.

A PAW order dated August 21 directing refiners in Districts 1, 2 and 3 to increase their yields of motor gasoline 3 per cent and their yields of distillate fuels at least 2 per cent was interpreted in refining circles as another indication of a trend toward more normal operations at plants in this country. While the order explained that the decrease in yields of residual fuels which is necessary in order to secure the higher recoveries of the light products was temporary, economists of the industry have been pointing out for several weeks that increased yields of gasoline and distillates are desirable if refiners are to supply the demands assured for the balance of the year and through the early part of 1944. The order is not to be made effective if the changes will interfere with the production of war products. Some of the refiners who are engaged in the production of 100-octane gasoline components have stated that it will be impossible for them to increase their yields of motor fuels.

IT is pointed out that the availability of additional crude oil and products from Mexico, Venezuela and Colombia and the refineries of the Netherlands West Indies was probably a factor in the decision to increase the production of light products in this country. The Lake Maracaibo basin is the principal source of crude oil in South America and the crudes are low in gravity, giving a large yield of residuals when refined. Recent reports show that the production of these fields due to improved shipping conditions has greatly increased, relieving refiners in the United States of the necessity of supplying the Allied war machine with a large part of its residual fuel-oil requirements.

REFINERS in Districts 1, 2 and 3 in July had crude-oil quotas of 3,195,000 bbl. daily. They are to be increased in September. The increase in gasoline yields if generally effective will add at least 65,000 bbl. daily to the available motor-fuel supplies with an expansion of more than 100,000 bbl. daily in distillate output. There have been reductions in recent months in yields of fuel oil and distillate. The yield of fuel oil in June (latest report available) was 28.9 per cent which compares with 30.5 per cent in April. The yield of distillate dropped from 15.9 per cent in February to 13.2 per cent in June. The June yield of gasoline was 36.9 per cent. The December 1941 yields of these products were: Gasoline 45.7 per cent; distillate, 13.7 per cent, and residual fuel oil, 24.9 per cent.



Ickes and DeGolyer Will Head Petroleum Reserve Corporation

ANNOUNCEMENT in Washington this week of the appointment of officers for the recently organized Petroleum Reserve Corp., a unit of the Reconstruction Finance Corp., was interpreted to mean that the war administration, acting through the Department of Interior, is preparing to take an active part in foreign oil development in the immediate future.

Secretary of Interior Ickes will serve as president of the corporation. E. DeGolyer, widely known engineer and consultant who has been serving as assistant deputy administrator of PAW, has resigned that position and will become consultant to the new organization. Mortimer Kline, formerly assistant general counsel of PAW, has been appointed general counsel of PRC.

It is understood in Washington that Mr. DeGolyer will be the active head of the Reserve corporation. He is familiar with oil operations in the Western Hemisphere outside the United States. He headed a committee which visited Mexico several months ago in order to secure first-hand information regarding the present status of oil operations in that country, most of which are now directed by Petroleos Mexicanos which took over the properties of private companies following the expropriation in March 1938.

Recently Reconstruction Finance Corp. following conferences with representatives of the Mexican Government approved a plan to build a modern refinery at Mexico City with facilities to manufacture high-octane gasoline. The entire project, which includes the reconditioning of a pipe line connecting Mexico City to the Poza Rica field, the principal source of crude oil, will represent an expenditure of $15,000,000. It was approved as a war measure.

Little has been known of the plans for Petroleum Reserve Corp. since its organization was first announced a few weeks ago. As a subsidiary of the Reconstruction Finance Corp. its initial capitalization was announced as 1 million dollars.

Powers Are Broad

It is assumed that the capitalization of the corporation will be expanded to meet any requirements of the war program. It has been pointed out that the corporation would be in position to investigate and approve any oil project outside this country which was considered feasible and which would aid in assuring adequate oil supplies during the emergency. It is understood that its powers are broad including exploration, producing, refining, transportation and distribution.

It has been suggested that the corporation working with the State Department, as was done by RFC in the case of Mexican refinery construction, will work with the governments of the oil-producing countries outside the United States and aid in the financing of operations which would have government sponsorship. Private operators could also qualify for aid.

The PRC plans follow a period of several weeks which has brought a recovery in South American operations following drastic curtailments last year due to enemy attacks on shipping. The production of Colombia which for a period of several months was practically shut off from export outlets, has greatly increased. The production of Venezuela which was curtailed to about 50 per cent of normal is increasing rapidly. This is a reflection both of improved shipping conditions and the need of the Allies for oil supplies in addition to those available from the United States and other countries. This expansion is carried on by private operators and so far as known will not be involved in the operations of PRC. The Petroleum Reserve Corp., by some observers, has been termed a miniature PAW with a program which will ultimately serve foreign oil operations in much the same manner that the petroleum administration does domestic operations.

E. DeGOLYER

HAROLD L. ICKES

East Texas Operators Are Concerned Over Increase In Allowable

KILGORE, Tex.—Operators in the East Texas field are worried over the increase in allowable for that field of 12,235 bbl. for September. They point out that during the month of July pressures dropped 4.76 lb. to an average of 1,012.22 lb. per sq. in. and also that 88 wells went off production during the month, compared with 30 in June. In attempting to meet the demand for oil, the Texas Railroad Commission was compelled to ignore the request of the East Texas Oil and Gas Association to reduce operating days to 20 and the field will operate 23 days during September.

Independents in the field contend that the action of the commission constitutes waste in two ways, both by holding the production days to 23 and by increasing allowables. They say that a continuation of this trend will result in irreparable damage to the field and reduce ultimate recovery.

Late Reports Reveal Heavy Damage to Rumanian Plants

THE "vast bulk of the operating capacity of the refineries" in Rumania was destroyed in the air attack by AAF bombers on August 1, according to an announcement of the past week by the intelligence division of the air staff. The report indicates that the bulk of the Rumanian refinery capacity was damaged to the point where several weeks to several months will be required to place the plants back in operation.

Considerable importance in military circles is now attached to the bombing raid which is believed to have cut off at least one-fourth and possibly one-third of the Axis petroleum supplies in Europe. While some of the operating units can be rebuilt within a few weeks if the required materials are available, it is believed that the Rumanian operators will have difficulty in securing still tubes, instruments, storage tanks and other supplies which will be required before resumption of normal operations.

Crude-oil production in Rumania in recent weeks has been estimated at approximately 100,000 bbl. daily, practically all of which was refined at plants located in that country which have a total rated capacity in excess of 200,000 bbl. daily. Recent operations have been 25,000 bbl. daily under the average output before Rumania became involved in the war.

Military commentators are in agreement that a large part of the petroleum supplies from Rumanian refineries was used by Axis troops on the Russian front. Estimates as to the total supplies of petroleum and substitutes available to the Axis in Europe generally range from 300,000 to 400,000 bbl. daily.

According to information from the air staff operating in the Mediterranean area, "the refineries at which the American aviators struck were selected meticulously after months of planning. They were in three groups, at Ploesti; at Campina, 20 miles northwest of Ploesti; and at Brazil, 6 miles north."

The military announcement mentioned specifically the 43,000-bbl. refinery of Astra Romana, S.A. (Shell), the largest in Rumania. Regarding the damage at this and other large refineries the report stated:

"The largest of the Ploesti refineries was the Astra Romana, important because of its large production of gasoline, one-third of all Rumania's production cracking processes. It is also the central receiving station for oil from most of the other refineries. It pumps all oil moved to the Giurgiu terminal of the pipe line on the Danube, over which it is moved to Germany. We damaged its powerhouse sufficiently to put it out of operation, demolished its cracking installation and destroyed almost half of its operational capacity.

"The Steaua Romana refinery at Campina is a very modern plant with most modern distillation equipment. It was wiped out. We wiped out most of the vital parts of the Creditul Minier, which had large modern cracking equipment and an important aviation-gasoline plant. It was erected only last year.

"The Colombia refinery had a considerable proportion of cracking equipment. We destroyed most of its vital parts and cut its operational capacity in half. Half of the Phoenix Orion plant was obliterated.

"These were but some of the plants we hit. Damage was wrought elsewhere. Among the bombs we dropped were many of the delayed-action type and we are confident that their detonations are causing further havoc.

"This mission was planned painstakingly, months before it was undertaken. We did not go after the Rumanian populace but after the military objectives; we even chose Sunday as the day of the undertaking in the hope that the laborers who operate these refineries would be away from work and from the targets."

"The effects of this mission on the German war effort cannot be immediately apparent. They must show in the vast curtailment of an essential source of the European Axis' oil supply, in the enormous burden placed on the Axis transportation system by the necessity of hauling the crude oil from the Rumanian fields for refining at plants far distant from the fields and rehauling the refined product in many instances all the way back to Germany's Eastern front, to which the surviving refineries are not nearly so handy."

International News

Black smoke from burning oil shoots skyward emanating from the Columbia Aquila refinery in the Ploesti oil region of Rumania, as can be seen in this photograph taken during the early stages of the raid. Some of the Liberators that carried out this destruction can be seen aloft. A good portion of the damage was effected by delayed-action bombs which exploded after the planes departed. (U. S. Army Air Force photograph)

Interpretations Bring Important Changes In Labor Law Applications

This article bringing up to date the information on the Wage and Hour law and the Walsh-Healey Act was prepared for The Oil and Gas Journal by staff members of the Information and Compliance Branch of the Wage and Hour Division, U. S. Department of Labor. Provisions of special interest to the petroleum industry are particularly stressed.

WHILE the present minimum hourly wage under the Wage and Hour Law is 30 cents an hour, the universal minimum of 40 cents an hour will become effective October 24, 1945. Prior to October 24, 1945, however, the act directs the administrator to appoint industry committees for various industries to investigate economic and competitive conditions in the industry or industries and to recommend the highest minimum wage not to exceed 40 cents an hour which will not substantially curtail employment. Wage orders based on such recommendations already have established wage minima above 30 cents in more than 50 industries, the present minimum rates for such industry wage orders being 40 cents an hour in nearly every case.

On June 8, 1943, a committee met in New York City to recommend a minimum wage for the chemical, petroleum and coal products and allied manufacturing industries. The official definition of the industry includes petroleum refining, but does not include "any mining, quarrying or other extractive operations."* The operation of pipe lines by pipe-line companies also is excluded from the definition.*

As the act requires, this industry committee was equally representative of employers, employes and the public. During its deliberations the committee investigated existing wage structures in the industries concerned, where it is estimated that no more than 25,000 to 30,000 employes out of some 875,000 in the entire industry are now receiving less than 40 cents an hour. In petroleum refining, for instance, average hourly earnings of 70,803 wage earners in 177 establishments were $1.18 an hour in January 1943.†

The fact that no witnesses from the petroleum-refining industry asked for appearance before the committee was a further indication of the well-known fact that wages above 40 cents an hour are practically universal throughout this industry.

A public hearing on the question of whether the minimum wage recommendation of the industry committee should be approved or disapproved was held July 15 at the office of the Wage and Hour and Public Contracts Divisions in New York City. This procedure, which is required by the act, gives any interested person or group an opportunity to testify or present evidence for or against the proposed minimum wage rate. It is believed that the administrator will act on this recommendation in the near future.

Now that so much of our industry is devoted to war production, a great many concerns find that some or all of their operations are subject to the Walsh-Healey Public Contracts Act. This law applies generally to U. S. Government contracts for supplies, materials and equipment in excess of $10,000.

Not Retroactive

Nothing in the Walsh-Healey Act prevents any person from meeting his government contract out of stock on hand or manufactured before the contract was let. Thus it does not apply retroactively. The act does apply, however, to employes who do further work on such materials, either in processing or packing and shipping the goods after a contract is awarded. But if the company is engaged in manufacturing, truck drivers who are employed in making deliveries on a government contract are not subject to the act. Contracts which exceed $10,000 come within the act irrespective of whether the material is delivered in installments or in one lot.

These provisions have particular interest for the oil industry. Let us take the case of a company which operates its own refinery and receives a large government contract for gasoline. The Walsh-Healey Act will apply to those refinery employes who are engaged in manufacturing gasoline to fill the order and to those who load it for transportation by tank cars, tank wagons or vessels.

If the government contract is for fuel oil which is processed to meet the order, employes engaged in its manufacture and loading will be covered. But many fuel-oil contracts call for delivery to U. S. Government buildings where storage facilities are limited. Deliveries are made frequently and in small quantities. In such cases, if the company has oil enough on hand to meet the entire contract, only those employes engaged in loading the trucks or tank wagons would be covered by the Walsh-Healey Act. And this will be true even though additional oil is manufactured and added to the company's storage tanks to meet the commercial demands of the contractor's business.

Where a government contract exceeding $10,000 is awarded to a dealer who does not process oil but simply stores it and makes deliveries from his own tank wagons or trucks, both those employes engaged in loading the oil and drivers who make the deliveries will be covered.

It may happen that a dealer having several grades of oil on hand will mix them to obtain the proper grade for fulfillment of his government contract. Employes who do this mixing will be covered by the act. And if a chemist is employed to test the mixture, he also will be covered unless he qualifies for exemption as a professional employe.

In contracts for the delivery of crude oil where the contractor is a producer, the Walsh-Healey Act covers both employes engaged in extracting the oil and in preparing it for shipment.

Another type of government award should be mentioned. This usually involves a contract for all the gasoline the Government might want for its own automobiles and trucks in a given city. Under the terms of such a contract the driver of the government car may take it to any retail service station operated by the contractor and get gasoline. Service-station employes who "deliver" this gasoline will not be covered by the act.

These examples are by no means all-inclusive, but they do illustrate

(Continued on Page 132)

*It is expected that these operations will be considered by other industry committees at a later date.

†Source: Bureau of Labor Statistics, U. S. Department of Labor.

THIS WEEK

PRODUCTION—Texas allowable production for September 1,940,253 bbl. daily compared with PAW certification of 1,909,000. . . . Increase of 113,000 bbl. over original August allowable. . . . ¶New Jersey Standard proposes 5,000-ft. oil test near Morristown, N. J., as the wildest wildcat this year. . . . Texas can produce without waste 392,889 bbl. more oil daily than current output, Railroad Commission finds. . . . ¶East Texas operators worry over increase in September allowable production of 12,235 bbl. daily. . . . New shallow gas field opened near Alaskan Highway on Pouce Creek structure.

TRANPORTATION— Throughput of Norris City-East Coast 24-in. extension increased from 105,000 bbl. daily to 170,000 bbl. daily this week by putting additional stations in operation. . . . 950 miles of products line laid between Texas and East Coast. . . . Includes 840 miles of 20-in. pipe and 110 miles of 16-in. . . . ¶Revised form of Defense Supplies Corp Regulation 1 for petroleum compensatory adjustments recognizes claims of secondary as well as original shipper for payment of difference in rail and tanker rates. . . . ¶Construction of trans-New England pipe line from Albany to Boston disapproved by PAW.

REFINING— PAW orders production increase of 3 per cent in gasoline and 2 per cent in distillate fuel for Districts 1, 2 and 3. . . . Increase at expense of residual fuel. . . . PAW's expanded Construction Division to expedite construction of 100-octane plants. . . . Max B. Miller, formerly chief of PAW's refinery division, made director. . . . Restrictions on crude runs to stills by Gulf Coast refineries removed by PAW . . . in order to bring output of products closer to level of demand. . . . ¶Heavy damage done bulk of Rumanian refinery capacity. . . . Severe blow to Axis war plans. . . . ¶Additional witnesses urge Senate committee to approve demonstration plants to produce synthetic products. . . . ¶10,000 women employed in petroleum refineries of United States.

MARKETING—Number of service stations operating on Pacific Coast increases for fourth consecutive month. . . . Largest gain in California. . . . ¶Refinery gasoline demands in Districts 2 and 3 exceed supplies despite more severe rationing. . . . Prices firm at ceiling schedules. . . . ¶PAW again permits shipment of gasoline by barge into District 1.

PRIORITIES—WPB delegates broader authority to PAW for control of distribution of materials used by petroleum industry, and delivery of petroleum and its products.

FOREIGN—Mr. Ickes appointed president of Petroleum Reserve Corp. . . . Points to active oil development outside this country under supervision and with aid from this country. . . . Small-scale PAW may be formed to supervise outside operations.

At the Arkansas River 20-in. pipe for the products line is laid to the left of the 24-in. crude-oil line (with river clamps) of War Emergency Pipelines, Inc. Pipe added to the line is welded on ramp barge (left). Dredge (right) has moved more than 150,000 cu. yd. of sand, within the past month, which has forced the river to return from the new channel, cut during May floods which broke the 24-in. line, to the old channel on the other side of the river bed, more than half a mile away. After completing laying of the 20-in. crossing at the end of August, dredge will dig a ditch 2,000 ft. inland, floating as it proceeds, so as to place the two WEP lines 12 ft. below low water. Work is done by Williams Brothers Corp.

New Paloma Recycling Plant Will Have Daily Capacity of 50,000,000 Cu. Ft.

by L. P. Stockman

THE Paloma Operators' Committee, which recently was granted authority to proceed with installation of a modern high-pressure condensate recovery and recycling plant in the Paloma distillate field in Kern County, California, has awarded construction contract to C. F. Braun & Co. calling for completion of the unit by February 1944. Fabrication of the various vessels and equipment has been started and unless something unforeseen develops it is quite likely the plant will be completed well ahead of schedule. Early delivery of compressors, pumps, heat exchangers, high-pressure absorbers, pressure-storage facilities and other vital equipment has been promised, subject only to unavoidable delays. Foundations are at present being poured and other preliminary work is being done so that when equipment is received it can be erected with a minimum of delay.

Location of Plant

The housing to enclose operating equipment is scheduled to be completed within a short time and cement flooring and bases for pumps and compressors will be finished within the next few weeks. The plant will be erected in the northwest 40 acres of the NW 2-32s-26e. This location was deemed the most suitable as it is on high ground in contrast with much of the remaining acreage of the field which is submerged and contains swampy ground which would require extensive piling and the use of superheavy foundations resulting in higher construction costs. Freedom of ingress and egress from the location selected was also an important factor in the decision to erect the plant in the NW cor. Section 2. The projected Paloma recycling and pressure-maintenance plant, when completed, will represent an investment of roughly $2,000,000 and have a daily capacity of 50,000,000 cu. ft. of wet gas but allowance has been made so that capacity can be stepped up at a minimum of cost if future developments warrant.

Paloma, a large distillate field, was discovered in August 1939, by Western Gulf Oil Co. and Texas Co. in a joint well drilled near the C 3-32s-26e, on acreage leased from Kern County Land Co. This field is located slightly less than 20 miles southwest of Bakersfield in the southern end of the San Joaquin Valley and is reached over paved highways. Initial production of the discovery well, 2,230 bbl. a day of condensate and 14,750,000 cu. ft. of gas, is indicative of the productivity of the Paloma zone which is the equivalent of the Stevens zone of Miocene age and which has proved so prolific in other adjacent San Joaquin Valley fields. The deepest drilled well at Paloma was carried down to 11,422 ft. and failed to find the Rio Bravo and Vedder zones.

A large part of the productive and potentially productive acreage in the Paloma field is owned in fee by Kern County Land Co. and is held under lease jointly by Western Gulf and Texas Co. There are a number of smaller parcels located on the north flank of the structure held under lease by several other operators. Some of this appears well within probable limits of production. In the eastern end of the field, Western Gulf and Texas hold leases on acreage held in fee by the Los Angeles Athletic Club and Symons Brothers Development Co.

The Paloma field is located a short distance east of Buena Vista Lake in southern Kern County and being lower in elevation than the surrounding area forms a drainage basin for the water shed. Consequently much of the area is submerged from time to time, the maximum depth of water in the lowest part being approximately 9 ft. Immediately west of the Paloma distillate field is the Buena Vista Lake gas field, discovered by Ohio Oil Co. in 1934. This field has been developed very slowly as operators are desirous of securing maximum recovery and likewise production has been confined to a minimum. A 300-hp. pilot plant was installed in 1941 to determine the amount of gas the sand would take so that a properly designed repressuring plant could be erected for use in the field. This pilot plant has been in operation since installation and its use has permitted operators to produce 634,491 bbl. of condensate and crude oil without waste by reinjecting the surplus gas into the formation.

The modern high-pressure condensate recovery and recycling plant in the Paloma distillate field of California will probably be completed by February 1944. It will represent an investment of roughly $2,000,000. Contract has been awarded and foundations are already being poured. Early delivery of vital equipment is promised.

Completions to Date

A total of 10 wells have been finished in the Paloma field to date, 9 of which are producing from the Paloma zone and 1 from a deeper zone confined to the eastern end of the district. This deeper zone was discovered by Western Gulf and Texas below the Paloma zone in 12-7 Symons. The generally recognized Paloma zone was absent in this well. Due to limited drilling, the outer limits of production remain to be determined and it is not at all improbable that the ultimate productive area may approximate 5,000 acres. Authorization was recently received from PAW for the drilling of 14 new wells prior to completion of the new recycling unit and present plans call for the drilling of four new wells immediately. The Paloma sand is encountered below 9,950 ft. and thus if 14 new wells are drilled in the next several months the total footage would exceed 150,000 ft. in view of the fact the zone affords maximum penetration. Development costs are relatively high and the present drilling program therefore represents a projected expenditure of about $2,000,000.

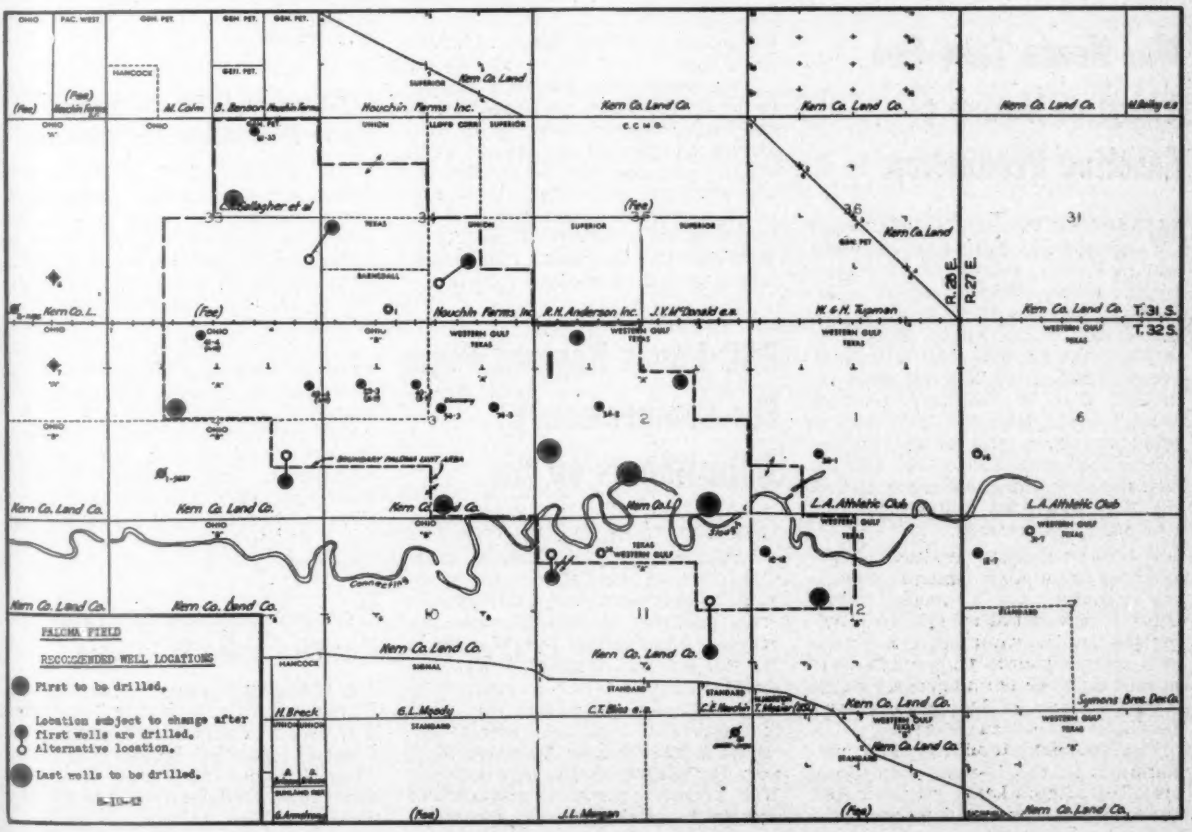
Western Gulf, Texas Co. and Ohio Oil Co. made a concerted attempt to secure the approval of all operators and landowners for a unit plan involving a total of 5,800 acres but, while 84 per cent of the group was sympathetic to the plan, a small minority refused to become parties to the agreement and forced abandonment of the original program.

Union Oil Co. drilled a dry hole on one parcel of property involved which removed this property from further consideration. Western Gulf, Texas, and Ohio, after unanimous agreement could not be secured and the original plan was abandoned, agreed among themselves to proceed with unit operation of their own leases totaling roughly 1,865 acres. Completion several months ago of a black-oil well out on the north flank of the structure by General Petroleum Corp. enlarged this operating unit when General Petroleum and its lessors unanimously agreed to join the unit plan. Subsequently, Barnsdall Oil Co., Union Oil Co. and their respective lessors, joined the unit plan and as additional wells are completed outside the area now covered by the present agreement, other operators may join the unit plan under certain conditions. When Western Gulf, Ohio and Texas proceeded with unit operation of their respective properties they made provisions for subsequent expansion by development on the basis of 40-acre parcels. In other words, when a well is completed outside of the present participating unit it is proposed to take into the unit all acreage enclosed within a line drawn from the outside corners of a 40-acre tract around the well to the outside points of the present participating unit. Completion of the outpost well by General Petroleum Corp. on the Gallagher lease out on the north flank of the structure extended the amount of participating acreage and permitted Union and Barnsdall to become members of the agreement on all property lying within the lines drawn from the Gallagher lease to the outside line on the operating unit of Western Gulf, Ohio and Texas.

Anticlinal Dome

The Paloma field is an anticlinal dome possibly modified somewhat by faults which remain to be defined and evaluated. This anticline is the largest closed dome in southern San Joaquin Valley without surface outcrop or topographic expression and it was discovered entirely by geophysics. This fold has a known length of 9 miles with an indicated geophysical closure of 500 ft. A comparison with the Cotton Valley field in Louisiana brings out a number of interesting facts which tend to show the possible importance of the Paloma field. The latest data available indicates there were 47,000,000 bbl. of condensate in place at Cotton Valley while similar data for Paloma indicates a 100,000,000-bbl. reserve and a probability that it may greatly exceed that amount. Cotton Valley has an average sand thickness of 26.5 ft. in the Bodcaw and 10.3 ft. in the D sand reservoir while the effective sand thickness at Paloma is placed at from 200 to 250 ft. Average sand porosities at Cotton Valley range from 16.5 per cent to 16.9 per cent and here again Paloma is superior as it has an average porosity of 20 per cent and an average permeability of about 100 md. with some sections of the field reaching 500 md. It is quite probable that considerable black oil will be produced around the rim of the distillate area downstructure at Paloma especially along the northern flank and downdip to the east. This is a normal expectancy for a distillate field and is further confirmed by completion of a black oil well on the Gallagher lease of General Petroleum at Paloma several months ago. Western Gulf is at present preparing to complete a new well, 36-1 Los Angeles Athletic Club, and indications are that this well in 7-32s-27e, will yield a normal black oil averaging around 35° in gravity. If this well does produce according to expectations it will be the second well at Paloma that has found a normal black crude oil. It will be another several months before the real importance of the Paloma field becomes apparent as only limited drilling has been undertaken to date, but all indications point to the existence of a major accumulation.

Map showing development schedule for unit operation of Paloma field



WPB Assigns PAW Broader Authority in Materials Control

WASHINGTON, D. C. — The War Production Board has given the Petroleum Administration for War a broader delegation of authority under the Second War Powers Act to control distribution of materials used by the petroleum industry, and also delivery of petroleum and its products.

The directive was described as principally a legal form and not a matter of major policy, and it was explained that previously WPB delegated specific priority powers to PAW whereas the new directive is a blanket delegation.

The action was considered desirable because the present delegation of such powers to PAW are in specific orders of the War Production Board which when revoked by either WPB or PAW cast doubt on the continuity of the delegation, so this independent document was issued on which PAW orders can rest when they are outside the scope of the authority contained in the executive order creating PAW and are derived from powers given through WPB.

The new order goes somewhat beyond previous delegations in that it covers uses of materials in the refining and transportation branches of the industry as well as in production and marketing, and also applies to foreign movements of blending agents used in the manufacture of petroleum products.

"This directive was deemed advisable because the previous delegations, which included most of these powers, were incorporated in specific orders of the WPB," Deputy Administrator Ralph K. Davies explained. "The uniform legal base established by Directive 30 will give PAW more legal flexibilty in issuing, amending or revoking PAW orders in those fields in which it derives its legal authority from the WPB. The new WPB directive does not make any changes in the agreements and working arrangements previously made between PAW and WPB relative to prior clearance with WPB of such PAW orders. It is a matter of legal form and not a major policy delegation."

War Needs Take One Third of Nation's Gasoline Production

WASHINGTON, D. C. — With the stepping up of the tempo of the air war in Europe, gasoline requirements by the military have jumped to almost a third of all the gasoline produced east of the Rocky Mountains. A chart prepared by the Petroleum Administration for War last week indicated that the military requirements would take 30.6 per cent of total production east of the Rockies during the remainder of 1943, 37.6 per cent next year and 39.6 per cent during 1945. The 1942 military demand was only 12.5 per cent.

A broad variety of products is represented in military demands, including gasoline for airplanes, tanks, ships, trucks and other vehicles. During the Tunisian campaign, in excess of a million gallons of gasoline were burned daily by the planes in a single command, that of Maj. Gen. Jimmy Doolittle's strategic air force.

The allotment for all civilian consumption in the 17-state East Coast area, including all that goes to buses, trucks, taxis, farm vehicles and passenger cars, is now about 13,776,000 gal. a day.

At present, there are 126 refineries in the United States now contributing or scheduled to contribute to the ultimate production of the special (100-octane) gasoline required to keep the war planes at work. Their daily output is a military secret, but it is believed to be in excess of the nearly 14,000,000 gal. of regular gasoline allotted to eastern civilian vehicles.

DSC Issues Revised Form For Compensatory Adjustments on Oil

WASHINGTON, D. C. — Defense Supplies Corp. has issued a revised form of Regulation 1 for petroleum compensatory adjustments covering payment of the difference between rail and tanker freight rates on oil shipped into District 1 by tank car.

The revision recognizes the zones and trainload terminals within District 1 established by Directive 59 of the Petroleum Administration for War. Formerly payment was allowed only to the original shipper for movement up to the terminal where title to the oil changed. The revision permits a claim to be filed by a secondary shipper who moves oil from a terminal within a single zone, even though that terminal was not formerly served by tankers.

Shipments of asphalt into District 1 are also made eligible for transportation payments, and a formula is set up based on the difference between the rail freight from other districts and from former sources of asphalt within District 1. Another new provision permits withholding payments from shippers who are in debt to the tank-car pool fund.

Changes in Personnel Of PAW Announced

Several changes in the staff of the Petroleum Administration for War have been announced during the past week.

Herbert R. Hansen has resigned as assistant director of the Materials Division and will return to Superior Oil Co. in Texas as purchasing agent. His successor has not been announced.

David L. Trax, of the production department, Gulf Oil Corp., Tulsa, has been appointed special assistant to the director of materials with headquarters in Washington.

Roger M. Wilkinson, of the New England marketing department of Socony-Vacuum Oil Co., Inc., has been appointed assistant director of marketing for PAW for headquarters in Washington.

Oklahoma Commission Will Hear Proration Arguments

OKLAHOMA CITY, Okla. — The Oklahoma Corporation Commission has set September 1, at 10 a.m., for a hearing here on an application of Peppers Refining Co. for the lifting of proration on production from the Wilcox zone in the Oklahoma City oil field.

"Countless" wells in the pool, the application states, are underproduced. It is charged that the 1 per cent reported as overproduced "are so reported by reason of some technical nonconformity to the rules of the commission, and applicant believes the conservation officer is making no effort to restrain production of those wells which are shown to be overproduced."

Gathering Lines Are Laid For Magnolia Pipe Line

In Jackson County, Texas, Black Construction Co. is laying 7 miles of 4-in. and 6-in. pipe for Magnolia Pipe Line Co. In the Seeligson area of Texas another contractor is laying some pipe of the same sizes for the company.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Matter of Sequence

THE hearings of the Senate committee at eastern and Rocky Mountain points regarding the possibilities of producing liquid fuels from coal and shale should serve a constructive end.

If the need is established there should be no delay in authorizing a reasonable expansion in the Government's experimental work. It will add to the information regarding a development which has progressed far enough to be a guarantee against shortages of petroleum substitutes for this country.

But the public reaction to some of the testimony indicates there is danger that the facts as to the commercial possibilities of these operations at this time will be misconstrued.

In some quarters the attitude has been fostered that the existing petroleum industry has reached the end of the road in finding new oil and for that reason there should be an immediate and large-scale production of substitutes regardless of cost.

As to this and all the allied questions regarding shortages that have been raised in recent months, there is a logical sequence which is technically and economically sound that should be followed in arriving at answers.

In the first place every effort should be made to continue petroleum operations as they have been in the past. It has not been shown that they can't be. There can be no justification for the conclusion that it is impossible for the petroleum industry to keep pace with the demands until all the resources in manpower and materials and the incentives of adequate return have been given free play.

The release of these forces of a long-established enterprise which have nullified every pessimistic prediction of the past relative to the finding of oil, will also expand recovery operations and bring to the surface billions of barrels of oil which cannot now be produced.

The costs to consumers in giving operators another opportunity to resume high speed and to demonstrate what they can do, will be only a fraction of those which are assured in the establishment of a synthetic industry.

Then there is the refiners' contribution. Refiners before December 7, 1941, under the pressure of rapidly increasing motor-fuel demands, had increased their average yield of gasoline from a barrel of crude oil to approximately 45 per cent. But a large part of the 55 per cent that is left can be manufactured into motor fuels at costs far less than those involved in the production of substitutes.

It can't be done with a refinery price for gasoline of less than 6 cents per gallon which has been the level in recent years. Refiners, with their old and new manufacturing arts, can make a substantial contribution to the solution of any problem involving essential petroleum products once they are given the opportunity and incentive to do so. Closely allied with these refinery operations are the future possibilities of manufacturing petroleum liquids from natural gas.

What this amounts to is a plea not to accept costly substitutes until it has been clearly demonstrated that the production of the cheaper products cannot be maintained. If the present framework of this industry is not sufficient to meet all the demands, consumers can rest assured that managements will extend their activities in an economic manner to include those operations from which the required synthetic supplies can be obtained.

Texas Railroad Commission Surveys Possibility of Increasing Production

Texas is being called on for additional production to overcome declines elsewhere and to meet increased demands. The amount available for this purpose is estimated to be 392,889 bbl. daily above August output.

AUSTIN, Tex. — Following hearings in recent weeks, the Texas Railroad Commission has found that Texas can produce without waste 392,889 bbl. more oil daily than is being produced during August. August production is 1,817,000 bbl. daily so that a total of 2,210,000 bbl. represents the present daily available output of Texas. These figures are considered of great interest in view of the fact that Texas represents one of the few oil-producing states in which production could be increased and it is being steadily called upon to expand its output.

Members of the commission have also drawn attention to the fact that production figures as published in the press and by the A.P.I. are misleading, so far as Texas is concerned. The fact that Texas' crude-oil production is given at slightly above 1,700,000 bbl. daily when the PAW quota is 1,817,000 bbl. leads to the misunderstanding that either Texas cannot produce its quota or else that it is holding back some production. Actually, this is not the case for the PAW quota deals with all oils, crude, distillate, natural gasoline and other liquid petroleum products, while the production figures as generally published omit all but crude. Since Texas produces 116,000 bbl. of distillate, natural gasoline and condensate daily, it is meeting its quota.

Districts Producing to Capacity

According to the accompanying tables, four Texas districts, are producing to capacity, namely West Central Texas (7-B), the southeastern section of West Texas (7-C), North Texas (9) and the Panhandle (10). In addition three other districts can produce additional oil from only one field each. These are the South Central district (1) in which Darst Creek can add to its production. In the East Central (5) and East Texas districts (6), Van and Quitman are capable of meeting greater demands.

More than a 100 per cent increase could be obtained from the lower Gulf Coast district (2), mainly from Tom O'Connor, with important contributions from West Ranch and Greta. In July, 120,000 bbl. or about two-thirds of actual production represented the potential increase from the upper Gulf district (3). More than three-fourths of this potential increase was used up by the increase in allowables for this district during August and, with the exception of the new North Withers field, no large excess is available from any field in the area. A potential increase of about 65 per cent may be found in District 4 (South Texas) chiefly from Rincon, where added pipe-line capacity is needed, Seeligson and Stratton.

Districts 2, 3 and 4 can thus add about 130,000 bbl. daily to present production and of these districts the one nearest the market, namely the Houston area, has about reached its limit, without waste. The September increase of 92,000 bbl. if taken from these districts would nearly exhaust the available facilities of the whole Gulf Coast area for increased production.

Almost two-thirds of the potential

LIST OF FIELDS IN TEXAS SHOWING

	Availability	Increase over July	Increase over August	Maximum availability	Maximum increase over August
District 1:					
Darst Creek	10,000	3,330	3,330	.....	.....
District 2:					
Coletto Creek	1,320	884	884	.....	.....
Ganado Deep	1,500	446	446	.....	.....
Greta	8,000	6,283	6,283	.....	.....
Greta Deep	600	357	357	.....	.....
Jay Welder	250	50	50	.....	.....
La Rosa	4,500	3,886	3,443	.....	.....
Maurbro	1,500	400	400	.....	.....
McFaddin	6,400	1,233	1,294	.....	.....
North La Ward	2,240	146	95	.....	.....
Placedo	6,500	2,080	2,080	.....	.....
East Placedo	1,200	322	322	.....	.....
South Caesar	2,550	1,398	1,389	.....	.....
Tom O'Connor	50,000	16,834	16,834	86,000	52,834
West Ranch	25,000	7,479	7,479	.....	.....
Total	111,560	41,798	41,356	147,560	77,356
District 3:					
Cedar Point	2,400	226	226	.....	.....
Clam Lake	1,250	863	863	.....	.....
Clear Lake	6,000	1,971	0	.....	.....
Conroe	65,000	11,487	0	.....	.....
Fairbanks	8,000	154	0	.....	.....
Fig Ridge	3,000	564	564	3,600	1,164
Fishers Reef	170	27	27	.....	.....
Hastings	60,000	12,007	0	.....	.....
La Belle	600	160	.....	.....	.....
League City	2,406	0	0	4,991	*2,585
North Withers	....	.....	.....	18,400	10,437
Manvel Oligocene	6,000	861	861	.....	.....
Markham North (Cornelius sand)	3,450	2,748	2,748	.....	.....
Oyster Bayou	6,000	2,200	2,200	.....	.....
Raccoon Bend (Cockfield)	9.000	4,940	0	.....	.....
Sour Lake	1,463	180	180	.....	.....
Seabreeze	1,850	740	740	.....	.....
Rowan	750	402	402	.....	.....
Segno Deep	4,000	258	258	.....	.....
Sugarland	10,000	6,100	.....	.....	.....
Thompson	31,000	12,993	1,059	.....	.....
Thompson, South	7,500	842	.....	.....	.....
Tomball	10,000	726	726	.....	.....
Webster	60,000	33,824	.....	.....	.....
Big Creek	800	350	350	.....	.....
Hankamer	800	360	360	.....	.....
Moore (Orchard)	150	60	64	.....	.....
Total	301,589	95,047	11,628	323,174	25,250

*By increasing dual completions.

increase in production is from the West Texas district (8). Here six large fields, North Cowden, Foster, Seminole, Slaughter, Wasson and Yates could add large volumes of oil to their present output. Added pipe-line facilities would, however, be needed in some cases.

This area represents the last major source of additional production in the country and four monthly increases in allowable like those of August and September would reduce even this area to its efficient limit of production. Texas is thus in a position to make up for declining production elsewhere for a short period and even to enable the industry to meet an increased demand for crude. However, the figures presented by the Railroad Commission show plainly the need for increased exploration and large discoveries, not in the near future but now, since the nation's major backlog may be gone before any major discovery could be fully developed.

Texas Discovery, Extension Wells Given High Allowables

THE Texas Railroad Commission has revised its method of granting increased allowables by liberalizing the rewards given to successful wildcatters. The system of granting the discovery well a higher daily allowable than the minimum prescribed by law continues and discovery wells are given a straight allowable of 20 bbl. per 1,000 ft. of depth for 18 months. Fractions of 1,000 bbl. are considered as even thousands, so that a 6,005-ft. well gets the same allowable as a 7,000-ft. well. These allowables remain in effect for a period of 18 months from the time that the oil is satisfactorily marketed, except that the completion of the sixth well within ½ mile of the discovery will terminate the discovery allowable for all wells within that group or cluster.

The definition of a discovery has also been greatly liberalized. Whether or not a well a short distance from other production is a discovery or an extension is often a matter of controversy. For the purposes of this regulation, the Texas Railroad Commission has ruled that any well completed in excess of ½ mile from the nearest producer is a discovery. This means that any operator who steps out more than ½ mile from production and extends a field is entitled to the same reward as if he had drilled on a new structure, except that the intervening wells might be drilled more rapidly than a new field. This regulation is, presumably, designed to encourage the rapid outlining of fields in order to enable operators to devise the best method of producing the oil without waste.

Improved Wildcat Rewards

These two provisions are believed to represent a considerable improvement over past attempts to reward wildcatters in that commencing the allowable from the date of marketing the oil rather than the date of completion of the well removes one factor which has caused frequent complaint in the past, namely that an allowable granted on paper helped no one if the oil could not be sold. Also, the man who extends a field by stepping out has often taken as great chances as the man who drills a new structure and should be equally rewarded.

The Texas regulation differs from that recently adopted by the Oklahoma Corporation Commission in that the latter allows a total bonus allowable of 5,000 bbl. to any well less than 2,000 ft. deep with 0.25 bbl. per foot beyond that depth, the bonus allowable to be produced within 1 year of the time of discovery. As in Texas, new sands are considered separate discoveries but there is no mention of extension wells and no definition of a discovery. Each case must be decided separately on its merits after application has been made for a bonus allowable.

THEIR ABILITY TO PRODUCE

	Availability	Increase over July	Increase over August	Maximum availability	Maximum increase over August
District 4:					
Colorado	2,512	1,200	212	.....	.....
Conoco Driscoll	4,000	1,074	1,074	.....	.....
Eagle Hill	750	250	250	.....	.....
Garcia	300	80	80	.....	.....
Glen	1,796	500	500	.....	.....
Guerra	650	167	167	.....	.....
Odem	2,120	383	.....	.....	.....
Richard King	3,173	400	400	.....	.....
Rincon	7,500	688	637	10,000	3,137
Seeligson	12,000	8,276	8,100	.....	.....
Stratton	9,500	5,874	5,084	.....	.....
Sejita	600	430	259	.....	.....
North Sun	1,040	340	340	.....	.....
Yturria	600	198	198	.....	.....
Total	46,541	19,860	17,301	49,041	19,801
District 5:					
Van	35,000	16,000	16,000	.....	.....
District 6:					
Quitman	2,000	670	600	.....	.....
District 8:					
Abell	4,400	1,967	1,933	.....	.....
Cedar Lake	2,800	1,846	1,846	.....	.....
North Cowden	40,000	32,960	32,949	.....	.....
South Cowden	5,700	4,045	4,045	.....	.....
Embar Ellenburger	4,800	3,600	3,600	.....	.....
Emma	3,283	2,598	2,598	.....	.....
Foster	27,000	21,242	21,242	.....	.....
Estes	5,000	1,005	1,058	.....	.....
Fuhrman West (Mascho)	3,600	3,252	3,252	.....	.....
Fuhrman	4,000	3,455	3,455	.....	.....
Johnson	4,445	2,802	2,802	.....	.....
Jordan	10,000	6,206	6,206	.....	.....
Keystone lime	2,500	948	948	.....	.....
Penwell	3,305	938	938	.....	.....
Sand Hills (Ordovician)	3,300	1,625	1,625	.....	.....
Sand Hills (Permian)	5,200	1,361	1,361	.....	.....
Seminole	25,000	19,422	19,422	.....	.....
Slaughter	65,000	38,886	32,478	.....	.....
Spencer	330	80	130	.....	.....
Ward, North	9,000	2,767	2,892	.....	.....
Waddell	5,000	3,000	3,000	.....	.....
Walker	1,500	500	500	.....	.....
Wasson	107,000	79,143	72,957	.....	.....
Warner Apco	2,000	1,207	1,207	.....	.....
Yates	50,000	28,092	28,108	.....	.....
Total	394,163	262,947	250,552	.....	.....
Total for state	900,853	439,652	340,767	960,938	392,889

Texas Allowable for September Marks an All-Time High

AUSTIN, Tex. — In its state-wide proration order for September, the Texas Railroad Commission announced an allowable of 1,940,253 bbl. compared with the PAW certification of demand for Texas oil for September of 1,909,000 bbl. This is 113,000 bbl. daily above the original August allowables and constitutes an all-time high. Of the increase, West Texas received the larger part, or 73,193 bbl. Net allowables by districts are:

District—	Sept. 1	Aug. 1
1	19,796	19,663
2	121,758	105,881
3	477,506	491,460
4	161,841	164,480
5	28,543	28,801
6*	106,429	104,956
6†	387,381	375,146
7b	29,293	29,036
7c	20,131	19,726
8	327,642	246,584
9	130,579	129,180
10	122,354	96,552

*Exclusive of East Texas field.
†East Texas field.

There will be 21 general producing days with East Texas on a 23-day schedule and other fields on 24 and 27-day schedules, respectively. The biggest increase was in the Wasson field whose allowable was jumped from 34,045 bbl. to 50,505 bbl. daily. Slaughter received a 23,078-bbl. increase to 45,853 bbl. and North Cowden was jumped 10,803 bbl. to 17,854 bbl. The principal change in the Gulf Coast district was a decrease in allowable for the Webster (Friendswood) field of 15,518 bbl. to 44,800 bbl.

Federal Order Digest

OPA Regulations

Mileage Rationing: RO 5C Amendment 71 deals with issuance of new Class A or basic Class D ration books, effective 12:01 a.m., August 16.

Antifreeze Solutions: Amendment 6 to MPR 170 requires statement of strength of antifreeze solution and places maximum prices on Type N antifreeze. Effective August 16.

Rubber and Products and Materials Containing Rubber: Amendment 5 to RPS 66 sets up maximum prices and specifications for recapping of tires, effective August 23.

Stoves: RO 9A, announcing a plan and timetable for instituting this plan for rationing all stoves, including oil and gas, effective August 24.

WPB Regulations

Galvanized Ware and Nonmetal Coated Metal Articles: Supplementary Limitation Order L-30-a as amended restricts the manufacture of storage cans from petroleum products except 5-gal. cans of 28-gage and lighter. Effective August 17.

Tubular Goods: General Preference Order M-21-b-2 tells how, under CMP, a distributor obtains supplies from producers and from other persons for stock or for delivery to customers. Includes standard and line pipe, oil-country casing, tubing and drill pipe and couplings. Effective as amended October 1.

Valves and Valve Parts: Limitation Order L-252 as amended presents specifications for different types of valves which may be manufactured, effective August 16.

Delegation of Powers to PAW: Under Directive 30 a uniform base upon which PAW orders can rest is set up. Delegations outside the scope of Executive Order 9276 have hitherto been contained in specific directives. The new directive does not change previously existing agreements and working arrangements between WPB and PAW. It is largely a matter of legal form and not a major policy delegation.

PAW Regulations

Chlorine as Additive: Because of increased available supplies, PAW amended its Recommendation 40 to remove chlorine from the list of critical materials used as additives in the manufacture of extreme-pressure lubricants. Effective August 17.

Shipping Gasoline: PAW Administrative Order 7 prohibiting shipment of gasoline into District 1 by barge has been revoked.

Refinery Yields: A day letter from PAW to refiners dated August 21 instructs refiners to increase percentage yields of motor fuels by at least 3 per cent and of distillate fuels by at least 2 per cent based on yields as of June 30. Residual-fuel-oil yields are to be decreased to permit these increases. Maximum yields of 100, 91 and 87 octane-number aviation gasolines, toluene, butadiene, petroleum synthetics are to be maintained and also presently scheduled production of petroleum coke, toluene concentrates, 80-octane number all-purpose gasoline and aviation and heavy-duty lubricating oils.

Ten Thousand Women Are Now Employed In Oil Refineries

WASHINGTON, D. C. — Ten thousand women are now employed in petroleum refineries in the United States, according to an estimate of the Refining Division of the Petroleum Administration for War. The estimate is based on a survey made of 74 refineries which revealed that there were 2,627 women among the 27,646 employes at these plants. Of this group 856 women were employed in refinery operations, 39 on maintenance, 477 in laboratories, 1,156 in offices, and 99 on other types of work.

Regarding the employment of women at refineries the deputy petroleum administrator for war says:

"Experience has shown that women can do and are doing excellent work in refineries throughout the country. Despite the fact that the petroleum industry is losing many skilled workers to the draft and to other types of employment, it is essential that there shall be no reduction in the processing of petroleum products because of manpower lack.

"A number of refineries already are employing women in all parts of their plants, and the results have been gratifying. As the war continues, more and more plants will find it necessary to train women to tasks that have heretofore been considered possible only for men to do.

Employment of women in refining operations, according to the PAW investigation, has been made possible in part by job dilution and reorganization of job functions, in many cases women have replaced men on an equal basis, but in others the ratio of women on similar jobs ranges from three to two and two to one. In most instances, women are paid the same rate as men for comparable work. Some company officials consider women particularly suitable for refinery operations that characteristically require sense of timing and an ability to keep track of several continuous duties.

Because women cannot perform heavy-duty work, some refiners have devised mechanical aids, such as counterbalances, rollers, and conveyor belts. Result, in some cases, has been a reduction of labor costs. One company reported that when a short stretch of conveyor track was installed, it became possible to use 18 women to do the work formerly performed by 24 men.

One refinery already has organized its training courses into three periods: induction, training, and provisional (in which women actually perform the work to which they will be permanently assigned). Among other duties, women are taught to open and close valves, fire stills and boilers, start and stop pumps, gage tanks, handle laboratory equipment, etc.

Senators Hear Testimony on Synthetic Liquid-Fuel Operations

BUTTE, Mont. — At the request of Gov. Sam C. Ford and as the official Montana representative Dr. Francis A. Thomson, president of Montana School of Mines and director of the state Bureau of Mines and Geology, attended the recent hearing on liquid synthetic fuel at Sheridan, Wyo. This hearing was called by Sen. Joseph C. O'Mahoney, chairman of the war-minerals subcommittee of the Senate committee on public lands and surveys. Present at the hearing as members of the committee were Senators Edward V. Robertson of Wyoming, Abe Murdock of Utah, and Chan Gurney of South Dakota. Principal witnesses on behalf of the Government were the following U. S. Bureau of Mines officials: R. R. Sayers, director; A. C. Fieldner, chief of fuels and explosives service; A. J. Kraemer, senior refinery engineer of the petroleum and natural-gas division, and H. H. Storch, principal physical chemist, all of whom gave enlightening testimony as to the feasibility of supplementing existing oil-well production from three sources: (1) By distillation of oil shale, (2) by mining and treatment of oil sands, (3) by hydrogenation or by treatment in the Fischer process of various grades of coal.

Advocate Bill's Passage

The Bureau of Mines' technologists all warmly advocated passage of S.B. 1243 introduced by Senator O'Mahoney, "Authorizing the construction and operation of demonstration plants to produce synthetic liquid fuels from coal and other substances in order to aid the prosecution of the war." Emphasis was placed both by the Wyoming senator and by Senator Murdock on the fact that the bill provides for demonstration plants only to be built by the Bureau of Mines, and that the results from these demonstration plants would be made available for private industry in order that actual large-scale production might be carried on under the free enterprise system.

Testimony was presented by the Bureau of Mines witnesses to the effect that small-scale experiments show that the ultimate gross yield in gallons of gasoline per ton of coal processed ranges between 136 gal. for a high-grade bituminous coal from Utah to 63 gal. per ton from North Dakota lignite. Coal from the Rosebud seam in Montana showed a yield, according to bureau tests, of 81 gal. of gasoline per ton of coal. The above yields, it should be emphasized, are in gallons of synthetic gasoline per ton of coal processed and do not include coal used as heating fuel in processing. When this is taken into account the yield per ton of total coal processed plus that used for heating in the process is reduced to roughly 50 per cent of the above figures. Some confusion arose in the hearing with regard to this item of gross yield and net yield. Cost figures, although purely tentative, indicated that synthetic fuels will not be competitive with gasoline from petroleum at present prices.

Large-scale plants for the production of motor fuel from brown coal are in operation in Germany; in fact, the greater portion of Germany's gasoline supply is derived from this source. A substantial amount of coal-derived gasoline is also being made in England at the present time. Bureau technologists testified at the hearing that they had recently visited and inspected the British plant.

Dr. Thomson, in his testimony, stressed the fact that there are over 300 billion tons of known mineable subbituminous lignite coal in eastern Montana, which, with the exception of the large stripping operation at Colstrip in Rosebud County, is now largely unutilized and awaiting development. He also emphasized that, although this Montana coal comprises about one-tenth of the known national coal supply of 3 trillion tons, much of the balance of the nation's coal supply will be needed for metallurgical and industrial purposes and that for this reason the lignites of Montana and North Dakota should be given especial attention in any program for the manufacture of synthetic liquid fuel from coal. He also pointed out that much of Montana's coal can be recovered by stripping—that is, by removal of the overburden and recovery of the coal by mechanical shovels without resorting to underground mining, and stated that the output of Colstrip averages approximately 60 tons per man per day.

National Petroleum Association to Meet in New York September 21

The tentative program for the 2-day forty-first annual meeting of the National Petroleum Association at the Hotel Waldorf-Astoria, New York City, on September 21-22 is announced by Fayette B. Dow, general counsel for the association. The program will feature all major phases of the present problems of the industry, especially manufacturing, military conditions and the postwar international situation as it is now seen.

The tentative program is as follows:

Tuesday, September 21

10 a.m.

Department of Manufacture. M. C. Mallon, presiding.

Base Oil Evaluation for Heavy-Duty Service.

2 p.m.

President's Address. H. A. Logan, president, National Petroleum Association.

"International Aspects of the American Petroleum Industry," Dr. Joseph E. Pogue, vice president, Chase National Bank.

"Wartime Refining Processes in Postwar Era," Dr. Gustav Egloff, director of research, Universal Oil Products Co.

The War, the Army and You. Talks and battlefield pictures by the War Department.

7 p.m.

Fellowship Banquet. Reception and cocktails.

Wednesday, September 22

10 a.m.

Department of Traffic and Transportation. Harry E. Elkins, presiding.

2 p.m.

"Refining," Bruce K. Brown, assistant deputy petroleum administrator for war.

"District 1 Problems." H. W. Dodge, director in charge, District 1, Petroleum Administration for War.

"Competitive Enterprise," Dr. Alfred P Haake, economist.

Pan American Buys Properties of Adams Oil

HOUSTON, Tex.—Adams Oil & Gas Co. has sold its interest in oil and gas properties in Chambers County, Texas, to Pan American Producing Co. for cash and notes totaling $9,500,000. The cash payment was $4,000,000 with five $1,000,000 notes due in 1944 and 1948.

Nine Executives Appointed As Diesel-Engine Committee

Nine executive representatives of firms manufacturing diesel engines have been appointed to a Diesel Engine Manufacturers Industry Advisory Committee. All types of engines and all localities are represented on the committee. Pricing problems will be considered by the committee.

Members of the committee are C. H. Hofmeister, Cummins Engine Co.; E. J. Schwanhausser, Worthington Pump & Machinery Co.; A. W. McKinney, National Supply Co.; Wesley B. Moore, Fairbanks, Morse & Co.; C. G. Cox, Enterprise Engine & Foundry Co.; Grant H. Nable, Gray Marine Motor Co.; W. Blackie, Caterpillar Tractor Co.; J. G. Broz, Baldwin De La Vergne Engine Co.; F. H. Kilberry, Atlas Imperial Diesel Engine Co.

Petroleum Specialty Protects Lafayette's Fittings and Machinery

NEW YORK.—Since the beginning of salvage operations on the great Navy transport Lafayette, formerly the French Line luxury ship Normandie, a petroleum specialty which has the unusual property of displacing water from metal surfaces has been used to protect the vessel's fittings and machinery from the heavy loss which would otherwise have inevitably occurred from rusting.

The petroleum specialty is actually a series of several rust-preventing products, two of which have been used on the Normandie. These products penetrate water in contact with metal surfaces, spread out on the surface so as actually to push the water away, and effectively seal the metal from oxygen.

As soon as it was decided to salvage the ship after she had burned and turned over in the Hudson River, company representatives proposed the use of the rust preventives to officials conducting salvage work for the Navy. As a consequence, equipment removed from the ship, as she was stripped to lighten her, was washed in one of the rust preventives before being stored for later use.

New Rust Preventive

When water began to be pumped from the hull, new problems were presented, and an entirely new type of the rust preventive was developed for protecting the machinery deep in the ship's interior. This product had the same water-displacement properties as the product used for parts removed from the ship, but was changed in such way as to avoid fire hazard from using an oil product in the ship's enclosed spaces.

As the level of the water inside the hull was lowered by pumping, the ship's tremendous turbines and other machinery were sprayed with the new rust preventive as they were exposed to air. As a result, it is understood that the only turbine which will show substantial damage from corrosion is one which was alternately in water and in air, due to rise and fall of the tide, before it was possible to treat it.

Standard Oil Co. (New Jersey) technicians point out that little rusting ordinarily occurs on metals which are as deeply submerged as was most equipment of the Normandie. Rusting does not take place except in presence of oxygen, and the oxygen content of water decreases rapidly with increase of depth.

However, as soon as long submerged metal is brought to the surface, it is attacked by oxygen very actively. Rusting occurs at an almost visible ratio.

New York State Opens Areas to Oil Leasing

ALBANY, N. Y.—An opportunity is being extended to interested oil and gas operators to lease an area of approximately 1,698.69 acres of state land comprising parts of Steuben Reforestation Area 3 in the town of Bradford, Steuben County, and Schuyler Reforestation Area 1 in the town of Orange, Schuyler County, according to an announcement by John L. Halpin, acting conservation commissioner.

Texas University Fund Raised Nearly $4,000,000

AUSTIN, Tex. — The permanent University of Texas fund increased $3,838,781.93 during the year ended June 30, it was announced. The fund now totals $34,220,943.72. In May the fund was receiving royalty from 1,066 producing oil and gas wells, an increase of 102 in 12 months.

In addition to the royalties, the fund received $1,312,375 for bonuses paid at lease auction in December 1942 and $1,096,550 at an auction in June.

Date Announced for Launching Patrick C. Boyle

OIL CITY, Pa.—The Liberty ship, Patrick C. Boyle, will be launched at the Bethlehem-Fairfield shipyard on September 18, Adm. E. S. Land, U. S. Maritime Commissioner, announced in a letter to Rep. Leon H. Gavin of Pennsylvania. Mr. Boyle is the first of the early oil journalists to be thus honored. In addition to establishing the Oil City Derrick as "The Organ of Oil" in 1885, and founding The Oil and Gas Journal in 1910, Mr. Boyle was also one of the charter members of the Associated Press.

As one of the early oil scouts, in the days when scouting covered every phase of oil activity, Mr. Boyle was one of the best-known men in the industry.

Texas Mid-Continent Oil Meeting Dates Named

FORT WORTH, Tex. — The Texas Mid-Continent Oil and Gas Association will hold its twenty-fourth annual meeting and convention here October 13 and 14.

The convention will be streamlined and the majority of the program will be presented on the first day in keeping with regular practice in former years. Present plans call for an unusual array of nationally prominent speakers who will be announced shortly, according to George Sawtelle, Houston, president of the association.

DEATHS

Newton Blaylock, 57, separator man for Anglo-Canadian Oil Co. and for 14 years associated with Turner Valley oil developments, died in a hospital at High River, Alta., following a motor accident. A native of Birmingham, Ala., he came to Canada in 1929.

Samuel N. Potts, 61, assistant treasurer of Stanolind Pipe Line Co., died August 23 in a Tulsa hospital of heart disease. Mr. Potts had lived in Tulsa for 23 years, and was employed by Sinclair Pipe Line Co. from 1916 to 1930. He was made assistant treasurer of the Stanolind company in 1930.

F. E. (Gene) Brammer, 27, representative of Hause Valve Co. since 1934 and since the death of his father, A. C. Brammer (partner in the company) in 1941, general sales manager, died last month.

William W. Powell, 72, who spent a great many years with South Penn Oil Co., from which company he retired 15 years ago, died at his home in Bradford, Pa. He had been in ill health only a short time. He had been identified with numerous oil and gas companies.

E. H. Bender, 42, superintendent of the Borger, Tex., refinery of Phillips Petroleum Co., was killed when an airplane he was riding crashed while taking off from the airport at Borger. Mr. Bender was formerly of the Phillips office at Bartlesville, Okla., being transferred to Borger 2 years ago.

John G. Lantz, 75, pioneer oil operator, died last week at his home in Shreveport, La. He was a native of Blacksville, W. Va., but had lived in Louisiana for the past 35 years. He worked in Pennsylvania fields in their early days.

Lt. Raymond E. Campbell, 25, in the legal department of Gulf Oil Corp., Houston, Tex., when he entered war service in June 1942, is reported killed in action in the Sicilian campaign. Lieutenant Campbell was a battery commander in the antiaircraft coast artillery, serving with a volunteer group, the Rangers. He graduated in 1942 at University of Houston, where he majored in government. He was president of the Pre-Law Club in 1941 and a leader in other college activities.

Amed Soderstrom, sales manager of Big West Oil Co., Kevin, Mont., died August 1 from a heart attack. He was formerly a banker in Minnesota before moving to Montana, and had been with Big West for 25 years.

PIWC Fire School Gives Vital Wartime Protective Training

IT is important to have some knowledge of an oil fire itself in any consideration of its extinguishment. Three components are essential to its existence: fuel in vapor form, air (oxygen) and a source of ignition (heat). No fire will start if any one of the three is lacking; no fire will continue to burn if any one is taken away.

Explosions are very often associated with fires. In general there are two kinds of explosions of interest in handling petroleum. The first is the rupture explosion often called the "pressure" or "boiler type" explosion. In this case a liquid or liquid-vapor mixture or vapor in a container is expanded by heat to create pressure beyond the strength of the vessel. The result is a rupture explosion of the container. The liquid need not be combustible since serious rupture explosions can be experienced with any liquid—as water, wine, milk. However, when a rupture explosion of a container holding flammable or combustible material takes place, the danger is considerably greater because the material leaving the container after the rupture will often ignite. The second type of explosion is really instantaneous combustion where an explosive mixture is present and ignited. The factor which is decisive in this type of explosion is concentration of petroleum vapor. For instance, with gasoline, an explosive mixture in air requires a concentration of not less than 1 per cent and not over 6 per cent. If the concentration is too low, there will be no ignition, therefore no explosion. If the concentration is too high, there will be no explosion or instantaneous combustion, but should air be added the mixture can become explosive.

Gasoline-Tank Fire

What about a gasoline tank in a fire? The tank has vents. Assume a grass fire around it. The gasoline inside the tank become heated, vapors are forced through the roof vent. These vapors, being three and one-half times as heavy as air, will flow down (not up) to a lower level. Contacting the fire we will have a flashback and a vent fire on top of the tank. Here we had our fire triangle: fuel in vapor form, air, heat. Yet it will not flash back inside the tank and cause an explosion because normally the mixture in the vapor space is too rich. Heating the tank will increase the rate of gasoline vaporization and thus the richness of the mixture. Handling such a fire, if vent fire is put out first, a flashback will soon occur again. Ground fire should be put out first, then the vent fire. The latter would go out anyway as soon as tank began to cool. These same principles apply to fires involving gasoline tank trucks. Naturally, if the vent is clogged or too small, a pressure explosion may occur. Vapors will flow down when roof is thus blown off, and a flashback will occur, igniting the gasoline in the tank. Since "boilovers" do not occur with gasoline, there is no great danger here as long as gasoline remains inside the tank.

Crude and liquid butane coming out of 2-in. line, open 2-in. flange and split pipe representing typical oil well fire. Here crews are moving in. Two 1-in. lines in center are equipped with 5/8-in. straight tips and are directed at fire, about 2 in. above point where it is coming out of pipe, to bend vertical fire away from men. Two outside crews working in an angle with two 1 1/2-in. OCD nozzles, protecting themselves, the center crews and the man who will shut valve, using the forceful water spray to drive flange and split pipe fires away from various crews. Shutoff was made when men finally reached proper positions

ORGANIZATION OF PIWC FIRE SCHOOL

As a means of correlating the work of the oil industry in safeguarding its facilities from the unusual risks which war entails, a National Committee on Protection of Petroleum Facilities has been organized under the direction of the Petroleum Industry War Council. The activities of this committee have been carried on through six regional committees, one of which is the Great Lakes Region Committee, of which L. S. Wescoat, vice president, Pure Oil Co., is chairman. It is the function of these committees to correlate the plant-protection work of the industry with the military, the Office of Civilian Defense and PAW, all of which have varying responsibilities in this connection.

In order to comprehensively review the methods of oil-fire fighting which have been found effective, the Great Lakes Region Committee sponsored a fire school which was held recently. Over 400 men, representing the previously mentioned agencies as well as local fire departments and other industries handling substantial amounts of flammable products, were in attendance from practically every section of the country. Sessions were held at Roosevelt High School in East Chicago, Ind., and field demonstrations were conducted on the grounds of Socony-Vacuum Oil Co., Inc.'s refinery nearby. The school was under the general direction of William Hildebrandt, general superintendent of this refinery.

The faculty of the school consisted of H. J. Wilson, Tide Water Associated Oil Co., San Francisco, Calif.; George F. Prussing, director, Facility Security Division, PAW, District 5, Los Angeles, Calif.; W. N. Young, Shell Oil Co., Inc., San Francisco; and M. B. Anfenger, Standard Oil Co. of California, San Francisco, all of whom delivered papers and conducted classes. The program of field demonstrations, which was on a scale as nearly comparable to actual conditions as is possible to attain, was under the direction of S. D. Clithero, who was assisted by J. H. McKenzie, both of General Petroleum Corp., Los Angeles.

Others on the program were Lt. Col. Frank E. Wilder, Office of Provost Marshall General, U. S. Army; Comdr. Morton T. Seligman, U. S. Naval Air Station, Bunker Hill, Ind., and William W. Reed, Socony-Vacuum, East Chicago, Ind. Mr. Wescoat presided. The accompanying article outlines some of the principles of oil-fire fighting which were demonstrated at the school.

Faculty Security Division directors from four Petroleum Administration for War districts who attended the school are (left to right): George F. Prussing, District 5; Kraus Earhart, District 3; Frank A. Epps, District 1, and Edward J. Bullock, District 2

Kerosene presents a somewhat different problem, for under normal conditions the vapor space mixture in a kerosene tank is too lean (rather than too rich as in the case of gasoline) to ignite. If this tank becomes sufficiently heated, an explosive mixture may result.

Basic Principles

For successfully combating any oil fire, there is but one fundamental procedure: control of damage and further spread until extinguishment occurs. Method of procedure will be dictated by the particular physical conditions at each fire. These conditions may vary widely. Most important is an understanding of certain basic principles which fall into three groups. These are: (1) Fuels—the combustion characteristics and fire behavior of the oils and gases themselves; (2) extinguishers—how and why extinguishing agents work and what their limitations are; (3) influence and physical conditions of the fire—while these have little or no effect on the fundamental behavior of the fuels, they definitely affect the use and effectiveness of extinguishing agents. For example, foam can blanket a quiet oil pool, but not a falling stream of the same oil.

While there are two types of fires—those of contained fuels as in tanks or pools and those of flowing fuel—both can be extinguished by shutting off fuels in combustible form. It is important to know the tendencies of various fuels to assume a form in which they can burn. In providing adequate fire protection it is also essential to be familiar with the processes by which various agents or methods control burning fuels. Briefly, the latter are:

1. Providing a physical barrier between a source of fuel and its ignition; or
2. Blanketing the oil surface with foam, froth or other such means; or
3. Dilution of fuel vapor with inert gases; or
4. Heat absorption by use of water sprays.

Fuels—Characteristics and Fire Behavior

In outlining the characteristics and fire behavior of fuels they may be divided into three classes: (1) Gas and vapors, (2) liquid, (3) solid. For gas and vapors, cooling and blanketing are not practical extinguishing methods. The source must be shut off, the fuel diluted with inerts, or the fire must be physically "knocked out." When the vapor is heavier than air, extinguishment without shutoff may introduce serious hazard and generally is not desirable.

With flammable liquids all exposed oil surface is a potential source of fuel. Therefore, "complete surface blanketing" is an obvious extinguishing requirement. However, "cooling" to prevent sufficient evaporation to allow formation of combustible mixtures is also sometimes practical. The controlling factors are viscosity and flash point. Lubes, residuum and crude are viscous. During the burning of viscous oils, "heat waves" develop at the oil surface and progress downward at various rates and extents, depending on the oil. This heat wave is a gradually increasing layer of hot

oil, generally 300° or higher, and of higher flash point and viscosity than the original oil. If water is applied, it vaporizes after penetrating the oil surface. The resulting expansion of water being flashed into steam (increasing its original volume approximately 1,600 times), causes frothing and expansion of the surface oil, possibly to an extent that may overflow the container. In actual crude-oil tank fires, due to the normal water content, this may occur one or more times before the heat wave reaches bottom, even though no water is applied. When a heat wave progresses downward unimpeded until encountering bottom water, a similar expanding, but far more violent, boiling action occurs. For purposes of distinction, this latter phenomenon is called a "boilover," while that resulting from water or foam applied to the surface, or normal water content, is called a "slopover." Both cause burning froth to overflow the container, but in a slopover there is not only less oil expelled, but it is readily extinguishable. In some cases slopover froth, having been sufficiently cooled by the application of water, will not be burning.

Furnace oil, kerosene, and gasoline are nonviscous, therefore do not form heat waves or froth.

As to flash point; it should be remembered that butane, gasoline, and light crudes are "low flash" (below 100° F.). Lubes, fuel oil, and kerosene are "high flash" and give off explosive vapors only when at various temperatures above 100° F. Viscous low-flash oils can sometimes be frothed out, though usually must be blanketed with foam. Viscous high-flash oils can either be blanketed by froth formed when water is gently applied to hot surface oil, or can be cooled effectively by the gentle application of water spray to the surface.

Application of either water or foam to hot oil in tanks can be a dangerous procedure, as it may cause slopover of the container. Water precooling and deliberate, controlled, mild slopover may be needed to prevent an uncontrollable boil. The time element is vital. Long burning severely complicates extinguishment.

Nonviscous low-flash oils usually cannot be extinguished by cooling, nor can they be frothed out. Foam blanketing is needed and not complicated by possible slopovers or boilovers. Water precooling saves foam. Nonviscous high-flash oils cannot be made to froth out but under favorable circumstances can be extinguished by cooling with water spray. Liquefied petroleum gases, such as butane-propane mixtures are not unusual fire problems so long as confined. Upon escape from containers they generally vaporize immediately and the problem becomes that of a vapor fire. (Protecting containers against rupture is a separate subject.)

Most solid fuels commonly encountered are high flash: wood, coal, paper, fabrics. They are readily extinguished by cooling. Principal problem is to get an effective cooling agent into the seat of the fire so that reflashing is precluded.

Extinguishers—Function and Method of Use

In use of blanketing agents all must form complete "blankets" to be effective. The manner of application largely controls their effectiveness. Mechanical agents such as fire blankets, metal covers, sand and dirt are useful in covering small openings or limited surfaces from which may come fuel vapors. All act as physical barriers between a source of fuel and heat for vaporization and ignition. Tests show that a steel plate, a board or a blanket can be used with about equal convenience to interrupt the vapor flow in a fire at the dome of a gasoline tank truck.

Foam is used to blanket quiescent or slowly moving oil surfaces. Demonstrations showed how foam should be applied gently; how it may fail when dropped 4 ft. onto oil surface of burning gasoline in a drum. Being "expanded" water, foam will cause slopover of hot, viscous oils. The controlled production of "natural foam" by application of drops of water, either from spray or straight stream nozzles, often effects extinguishment of even quite large, high-flash, viscous oil surfaces.

As to diluents—CO_2, carbon tetrachloride, and steam function either to displace air from normal sources or as inerts to be so intermingled with fuel vapors that combustible mixtures are precluded. Demonstrations with conventional portable equipment show:

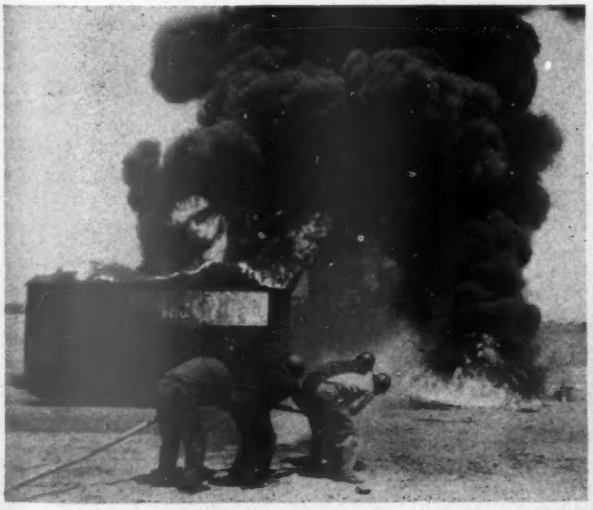
1. That all lack appreciable cooling qualities;

2. That application on to any fuel must be at a relatively high rate, unless circumstances are favorable to the retention of the inert (and heavier-than-air) gases immeditely over the fuel area, in which case the action conceivably is that of blanketing;

3. That where hot tank shells permit rapid production of considerable steam and there is ample outage for retaining the steam thus formed, water-spray equipment can effect extinguishment within small tanks of low-flash oils:

4. That relatively smaller applica-

Left: Fire in 22-ft. crude tank, 1 1/2-in. "bomb fragment" hole, 2 ft. aboveground, has been plugged and crew is completing extinguishment of ground fire. Two 1 1/2-in. OCD nozzles had been used to drive ground fire away while 1-in. fan spray fog tip protected man who inserted plug. Right: Tank fire apparently extinguished with two 1-in. by 20-ft. applicators and cooling of tank shell in progress



tion rates and quantities of inerts are effective after water precooling on fires of low-flash oils which have burned long enough that surroundings become potential reignition sources.

Water, it was demonstrated, is one of our best cooling agents—because it has the highest latent heat of vaporization of any common substance. The over-all efficiency of its use as a cooling agent depends on the relative amount of water surface presented for heat absorption. Thus, water sprays, drops, and films provide more efficient cooling than volumes of greater mass. Being heavier than most liquids, water can float and spread burning oils. Since it expands more than 1,600 times on being converted to steam, application of water may greatly increase the volume of an oil and cause expansion to result in overflowing containers. In addition to these uses and limitations, the use of water from hand lines was demonstrated to show:

1. Protection of severe exposures by water films;

2. Absorption of heat waves in viscous oils;

3. Screen protection needed for access to effect fuel shutoffs;

4. Utilization of "hitting power" to wash burning liquids to locations where they may burn harmlessly.

Fires started by incendiaries are exactly like fires in the same oil ignited by any other means. Our interest is, therefore, primarily concerned with (a) whether or not incendiary substances will ignite various oils, (b) to what extent first-aid or normal protection is useful in retarding or preventing the spread of fires, (c) the effect of incendiary bombs themselves on oil containers. Demonstrations indicate:

1. That oil in depth may not be ignited by incendiaries which ignite below the surface;

2. That burning incendiary substance falling onto or burning at or on the surface of oils will generally cause ignition, but that spread of fire can be controlled whenever it would normally be controllable;

3. That tank bottoms may not be burned through if covered by oil;

4. That a shell or fragment-punctured container, from which burning fuel is leaking, is susceptible to and probably will not require any different procedure from that which normally would be effective.

Rules of Oil-Fire Fighting

The primary rules of oil-fire fighting are relatively simple, whether the fire is a one extinguisher or large organization problem.

Rule 1. Plan appropriate action. Lives and time will be saved and serious mistakes will be avoided by taking the time necessary to determine what the fire conditions actually are and what equipment and methods can be effective. Preconsideration of potential problems is vital in congested areas or extra dangerous processes.

Rule 2. Have one directing head. Generally this should not be the refinery superintendent or manager. Preferably it should be the man who best knows the exact detail of operating conditions of the moment. It is, of course, proper that the regular fire-control crews should function in line with their established organization, but direction of their efforts should be in the hands of the man most familiar with the workings of the area involved.

Rule 3. When more than a single fire fighter is involved, make sure that the various units not only understand what they are to do, but also what every other crew is to do, where they will be. This permits flexibility essential to accommodation of accidents or unexpected conditions that may occur.

Rule 4. Pressure vessels within the fire may be weakened sufficiently by heat that failure occurs below normally safe relief-valve settings. When practical, reduce pressures on such vessels and see that exposed shell portions not in contact with liquid are properly cooled by water.

Handling Liquefied Petroleum Gases

Being highly volatile, liquefied petroleum gases flash into vapor upon release to atmospheric pressure and, of themselves, provide a "fixed" fire, the limits of which are those to which the velocity of flow may carry the vapors before they are consumed.

Because they are heavier than air, unburned L.P.G. vapors are highly dangerous, even in the open, and generally fires should not be extinguished unless the flow can be stopped. To a considerable degree this also applies to gases lighter than air. Regardless of what extinguisher or method is used, the important part of the procedure is shutting off the fuel.

Demonstrations showed that water in spray form can reduce greatly the intensity of these fires—that screen protection, for approaching shutoff valves inside the fire area, is best obtained from "velocity" type spray nozzles. It was also shown that CO_2 and Dugas can be used to a limited extent for screen protection in small fires; will knock out small fires of vapor, but usually do not handle liquid fires; increase in effectiveness as discharge velocity of the extinguishing agent is increased. Demonstration indicated that water spray and CO_2 can frequently be used at the same time to advantage.

(Continued on Page 88)

Using small upright stream of water to prevent spreading of fire, from two 2-lb. magnesium bombs, over oil surface

WEP RIVER CROSSINGS

by Paul Reed

THE most spectacular feature of the laying of the 20-in. and 24-in. lines for the War Emergency Pipelines, Inc., system has been that of laying pipe across rivers. No previous pipeline project has ever had pipe laid over such a variety of terrain as exists along the route from Texas to the East Coast.

At present the Williams Brothers Corp. has 18 river crossing gangs which have completed the laying of 24-in. line for the crude line and which will continue until the 20-in. line is laid for the refined products line. For river crossing work alone, this company uses 24 drag lines. Work is carried on under the supervision of Guy S. Connors, vice president and general superintendent.

River crossing operations in this article will be described as they were observed on a trip taken in July during the last stages of completing the 24-in. crude line.

Susquehanna Crossing

Across the Susquehanna River, near Marietta, Pa., a trench was dug by blasting and excavation which goes to a depth of 10 ft. below the stream bed where it is 20 ft. wide so as to hold the 24-in. line and the 20-in. line and provide for a possible third line. Water is normally 12 ft. deep. Shot holes were drilled with water-well spudders mounted on barges. At one time as many as eight spudders were employed. There have been four drag lines on this job.

Two lines of shot holes are drilled across the rocky bed of the river, 10 ft. apart. In each row the shot holes are 4 ft. apart. Shot holes are drilled 6 to 12 ft. through the rock and 5-in. and 6-in. casing is driven to the bottom of the holes of the same diameter to hold the explosive.

For work on the river, three boats have been built, propelled by gasoline engines driving stern paddle wheels. These boats are designated on the inventory by the following names, indicating their relative sizes: "Big Inch," "Little Inch," and "Half Inch."

Because of delays, due to high water, the preparations for laying the 24-in. line took about 3 months. There was also some delay because of changes of plan requiring widening of the ditch to accommodate more lines.

Delaware River

The same conventional method was used for preparing the trench across the Delaware River as was employed at the Susquehanna. Pulling of the pipe across the river from the Pennsylvania to the New Jersey side was done in the following manner: In the river itself, two barges supported the pipe by steel cable suspended between them. These barges were pulled to the New Jersey side by a cable attached to a tractor. Barges were held in the correct position over the trench by manipulation on the part of a crew on the barge of a wire line running through a snatch block held on one of several stakes placed upstream. Pulling the pipe to the river on the Pennsylvania side was done mostly by two rows of tractor and truck equipment. On the left side of the pipe a cable, running through a snatch block, was pulled by two tow tractors and one sideboom tractor. On the right-hand side, a bulldozer pulled a cable attached directly to the pipe. Further back, on either side, were low boy trucks in staggered positions. These pulled the cables directly attached to the pipe. At the rear the pipe was pushed by a bulldozer. The big snatch block cable was 1¼-in. diameter. The cable across the river was 1½-in. diameter. Other cables pulled by trucks were ¾-in. and ⅞-in.

Right: Blasting section of trench across Susquehanna River, Pennsylvania

Below: Pulling section of pipe from Pennsylvania to New Jersey at the Delaware River crossing

Conventional methods were used for pulling the pipe as well as for protection, which was provided for by having the pipe across the river ½-in. thick instead of ⅜-in. which is usual for most of route. Pipe was dou-

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ble coated and wrapped with a third or final flush coat of enamel before wooden slats were wired to prevent damage to the coating and wrapping. Every 40 ft. a wooden block is attached to the pipe by a light rope to serve as a buoy marking the position of the pipe in the river. In accordance with standard practice, sleeves are welded over the welds at river crossings.

At the Delaware crossing, the program calls for laying two 20-in. lines. Following the crude line, another one will be laid for products. It is customary on WEP lines to install a 4,800-lb. clamp every 25 ft. for 24-in pipe and 3,800-lb. clamps at approximately the same intervals for 20-in. pipe.

At this location there were added difficulties connected with crossing under a railroad, highway and canal fairly close together on the New Jersey side. Casing under the railroad was jacked by hydraulic jacks, instead of the tunneling or boring methods. Operations at the Delaware River were quite accessible since they were within a convenient distance of New York and Philadelphia. Consequently there were numerous visitors to this location.

Youghiogheny River

In great contrast to this is the inaccessible crossing of the Youghiogheny River in western Pennsylvania, located in a deep mountain gorge with ridges on each side rising steeply to a height of more than 600 ft. above the level of the water. From the top of one ridge to the top of the other a stretch of pipe 4,925 ft. long was used which had ½-in. wall thickness. The distance across the stream itself was only 175 ft. Part way up the side of each bank was a railroad. The banks were so abrupt that a 45° bend had to be made on each side. The west bank was so steep that 140 ft. of ditch could only be dug by hand. Much of the excavation on both banks was handled by an Insley hillbilly back hoe.

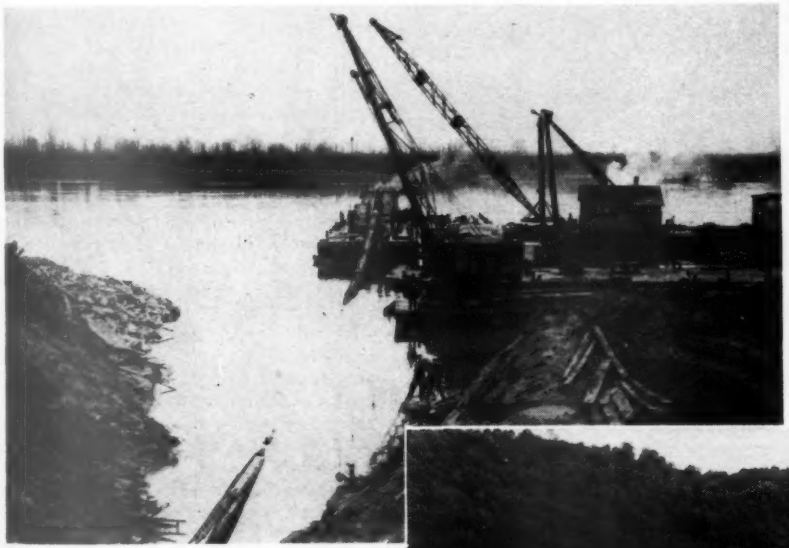
Access to the slopes was obtained by several zig-zag roads built for grades which were practical for moving equipment. Some equipment had to be lowered from the tops of the ridges by using winch lines from tow cats which were anchored. No stove piping was used. Three-joint sections were welded and pulled into place.

Other Crossings

Other river crossings laid for WEP by Williams Brothers Corp. are those across the following rivers in Pennsylvania: The Conestoga, North Schuylkill, Perkiomen, Darby, Codorus and the Monongahela. At all these crossings it was necessary to blast trenches and pull pipe across in the manner previously described with the exception of the Monongahela where a trench was dug with a dipper dredge and where the pipe was laid from barges by the same method employed at the Ohio and Mississippi rivers. At the Ohio River lines laid were one 24-in. and two 20-in. The program for the Mississippi River is two 24-in. lines and one 20-in. line. An article describing the blasting and difficulties encountered at the Mississippi River appeared in the May 13 issue of The Oil and Gas Journal.

In laying pipe across the South Schuylkill River to the refineries south of Philadelphia, pipe had to be laid 52 ft. below mean low tide. In doing this, a 5-yd. dredge was used. Darby River was swampy and a trench was made with a drag line. Further south several crossings were completed.

Right: Tops of both steep banks of the Youghiogheny River are 600 ft. above the bed of the stream which is 175 ft. wide at the crossing



Above: While 80-ft. sections are added by welding operations on the ramp of the laying barge at the Mississippi River, pipe is suspended from lowering-in barges for a considerable distance

Right: Two rows of shot holes, 10 ft. apart, were drilled across the Susquehanna River by water-well spudders through 5-in. and 6-in. casing to depths of 6 and 12 ft. in the rock of the river red. Casing is driven to the bottom of the holes to hold the explosives

Oil-Well Pumping Practices—No. 9

Plunger Travel of Pumps

by J. Zaba

The relation between the distance traveled by the plunger of a sucker-rod pump and by the polished rod involves many factors. Three formulas advanced for determining plunger travel are presented in this installment. This series, covering all phases of oil-well pumping, began in the July 1 issue.

THE pumping cycle of a sucker-rod pump has already been discussed, in general terms, in Installments 3 and 4 of this series. Now, with completion of discussion of behavior and characteristics of sucker-rod strings, it is possible to consider in more detail, the performance of the pump itself. Before, however, the discussion is undertaken of displacement, volumetric efficiency, factors affecting this efficiency and other related subjects, it is necessary to consider first the effect on action of pump of some of the pump's component parts.

Any sucker-rod pump, regardless of type or construction, can be reduced to four basic parts which are essential to the pump's operation. These four parts are: working barrel, plunger, standing valve and traveling valve. Of these four parts, the plunger, especially its travel and size in relation to performance of the system, received particular attention of those interested in investigation of the sucker-rod pumping mechanism. This is easily understood. Displacement of a reciprocating plunger pump depends on length of stroke of the plunger, number of strokes per minute and size of plunger. Of these three variables, the length of the surface stroke and the number of strokes per minute are determined by the surface pumping equipment. Even brief consideration, however, of the transfer of loads, from rods to tubing and back from tubing to rods, and of behavior of rods during the pumping cycle, makes it apparent that, generally, the stroke of the plunger differs from the stroke of the polished rod, both in magnitude and in phase relationship. The plunger stroke and size therefore remain still two variables governing, primarily, the displacement of the pump. Since the satisfactory displacement of the fluid by the sucker-rod pump is the most important requisite of an efficient pumping installation, the interest in these two variables is entirely justified.

Plunger Travel

Development of theories on the actual travel of the plunger in relation to the working barrel, paralleled, in general, the development of knowledge of the behavior, during the pumping cycle, of the sucker-rod strings.

Early investigations[1,2] dealt primarily with effect on plunger travel of the transfer of loads during the pumping cycle and of the over-travel of plunger under the influence of dynamic loads. When on the beginning of the upstroke the fluid load is transferred from the standing valve (tubing) to the traveling valve (sucker rods) the rods must stretch before the upward motion of the plunger starts. At the same time the contraction of tubing, with the release of the load, causes the working barrel to follow, for a certain distance, the upward motion of the plunger. Thus the relative motion of the plunger and of the working barrel, the effective part of the stroke, is shorter than the surface stroke of the polished rod by the sum total of tubing and rod stretch. At slow pumping speeds, usually less than 10 s.p.m., the rods and tubing stretch would be the only factors affecting the length of the plunger travel. As the pumping speed increases, however, the acceleration of the moving parts affects the performance of the plunger causing, at the reversal of the motion, an additional stretch of rods which results in over-travel of the plunger.

As the theories of vibration were applied to explain the behavior of the sucker rods during the pumping motion a new concept was developed of the effective plunger travel[3,4,5] With sucker rods considered a long elastic system with one end fixed and the other vibrating with 1° of freedom the plunger stroke becomes the amplitude of a forced vibration resulting from the effect of: (1) the disturbing force (the force available for moving the plunger), (2) the frequency of natural vibrations of rods and (3) the damping forces present in the system. The motion of the plunger is out of phase with and lagging behind the motion of the polished rod.

The normally expected and calculated length of plunger travel under given set of pumping conditions (speed of pumping, length of stroke, size of plunger and rods and depth of operation of the pump) can be still altered to a considerable extent by a number of other factors. Among these factors changes in pump friction and handling of free gas may bring about considerable changes in the length of plunger travel. The matter of pump friction is difficult to determine. While the coefficient of friction of different cup materials against the different metals of working barrel are known, the degree of lubrication present is an unknown factor. Furthermore the abrasive matter, quite often handled by the pump, may increase the coefficient of friction above the value for perfectly dry surfaces. In case of cup pumps the frictional load depends on the depth of operations of the pump, since the load is a function of the coefficients of friction and of the pressure on the cups. Gas handled by the pump may affect the travel of the plunger by changing the loads handled by the plunger.

Consideration of factors which affect the travel of a plunger indicates that this travel is difficult to determine with any great degree of accuracy. Formulas and methods have been developed, however, which agree in many cases quite closely with plunger stroke as measured by pump dynagraph.

Coberly's formula.—C. J. Coberly was first to evolve[2] a mathematical expression for over-travel of plunger due to acceleration:

$$e - e_1 = \frac{1.93(LN)^2}{1{,}000}$$

where

e = elongation of rods at bottom of stroke

e_1 = elongation of rods at top of stroke

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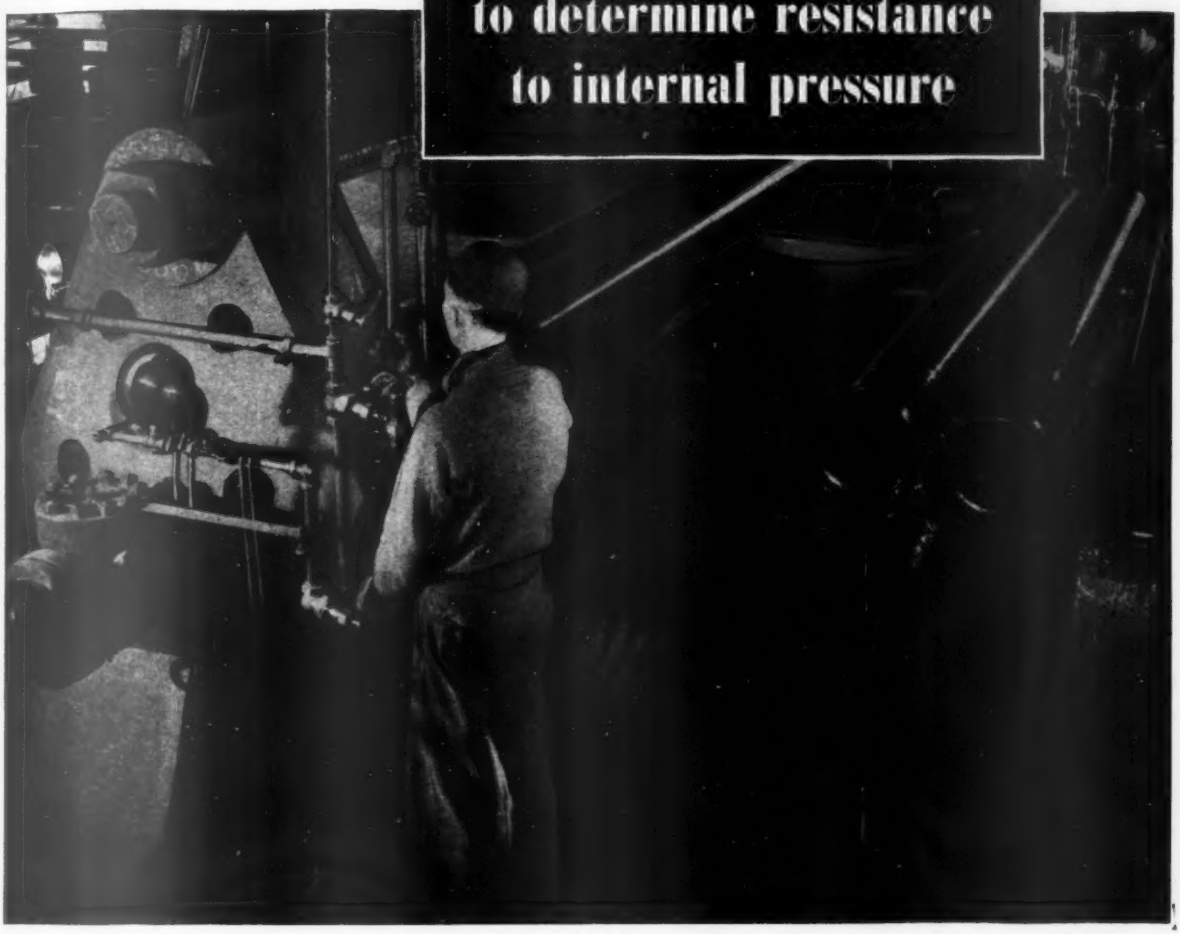

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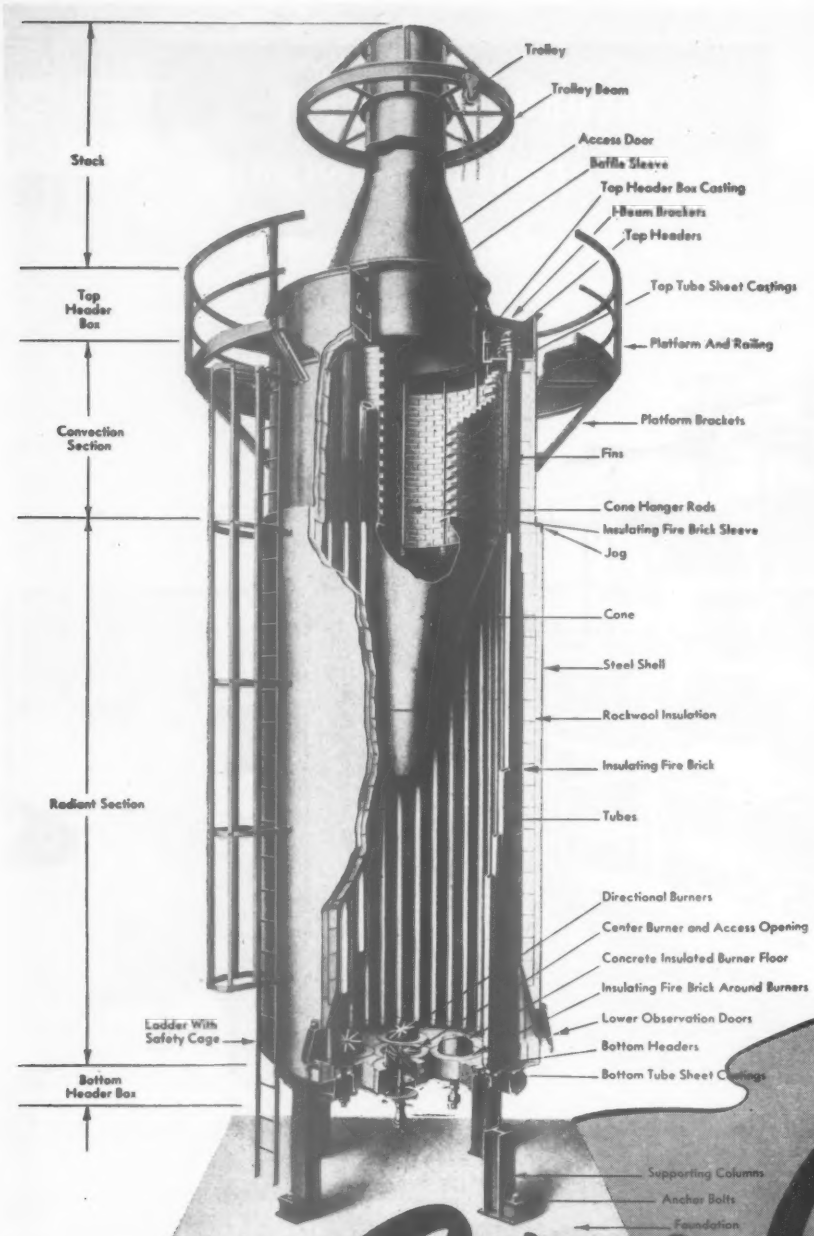

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$e - e_1$ = over-travel of plunger due to acceleration, expressed as per cent of polished-rod travel

L = length of sucker rods in 1,000 ft.

N = number of strokes

This equation was based on assumptions of a simple harmonic motion, no reflected stresses and no time lag in transmission of stresses through sucker rods. W. E. Gilbert[6] showed, through actual measurements of the plunger stroke, that the acceleration factor 1.93 varies from well to well. In discussion of W. E. Gilbert's paper, C. J. Coberly suggested an average value of 2.5.

The actual travel of the plunger equals the polished-rod stroke less elongation of rods and tubing plus over-travel of plunger as figured from Coberly's equation. The elongation of rods and tubing can be determined from charts furnished by some of the sucker-rod manufacturers or can be calculated from following two formulas assuming that the pump is set at fluid level:

$$S_R = .000000179\,(A_P - A_R) \times \frac{1}{A_R} \times L^2 \times S.G.$$

$$S_T = .000000179\,(A_P - A_R) \times \frac{1}{A_T} \times L^2 \times S.G.$$

where

S_R = stretch of rods, in.

S_T = stretch of tubing, in.

A_P = area of plunger, sq. in.

A_R = area of rods, sq. in.

A_T = cross sectional area of metal in tubing, sq. in.

L = depth of plunger, ft.

S.G. = specific gravity of fluid

Rieniets' formula. — Considering sucker rods and plunger as a long spring system with the one end fixed and the other free to vibrate, R. W. Rieniets[3] derived the following formula for plunger travel as a resulting forced vibration:

$$S_P = S_S \cos O + \frac{QB}{K} - \frac{2W_f}{K} - \frac{F}{K}$$

where

S_P = plunger stroke, in.

S_S = polished rod stroke, in., and other terms are as follows:

O is the phase angle, or the angle through which the crank moves before the motion of the plunger begins. This angle of lag depends on damping present and on the ratio of the natural period of vibration to the period of the forced vibration. Damping is difficult to determine. It has been found however that for very large number of wells the damping factor can be assumed as 0.8. The period of natural vibration

$$T = \frac{4 \times \text{rod length, ft.}}{\text{speed of sound in rods}}$$

(speed of sound in rods is being taken as from 15,800 to 17,000 ft. per second). Period of forced vibration T equals number of seconds needed for one revolution of the crank arm

$$T_2 = \frac{60}{\text{number of cycles per minute}}$$

The chart shown in Fig. 1 permits direct reading of phase angle O with given length of rods and speed of operations and assumed damping factor. To illustrate, assume a rod string of 3,600 ft. and speed of operation of 24 s.p.m. then:

Period of natural vibration $T_1 = \frac{4 \times 3{,}600}{17{,}000} = 0.847$ seconds

Period of forced vibration $T_2 = \frac{60}{24} = 2.5$ seconds

$$\text{Ratio} = \frac{T_1}{T_2} = \frac{0.847}{2.5} = 0.339$$

From chart for R = 0.339 and for assumed damping factor 0.8 phase angle O = 18°.

Q the disturbing force, in the second term of the formula, is the total load at the polished rod due to fluid load and acceleration of rods and fluid:

$$Q = W_f\,(1 + C) + 2W_rC$$

where

W_f = weight of fluid

W_r = weight of rods

C = acceleration factor = $\frac{W^2r}{g}$

W = angular velocity of crank-arm, radians per second

r = one-half polished stroke, inches

g = gravitational constant, inches per second, per second = 32.2 × 12

B, the magnification factor, is the factor by which the force at the beam is changed when transferred under conditions of constraint to the lower end of the string. This factor can be determined from chart shown in Fig. 2 by figuring period ratio, as in cal-

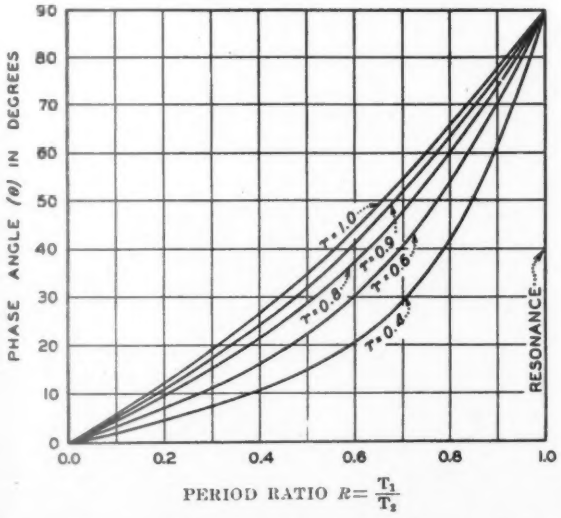

Fig. 1—Phase angle and period ratio for different values of damping (from "Plunger Travel of Oil-Well Pumps"—R. W. Rieniets, A.P.I. Drilling and Production Practice 1937)

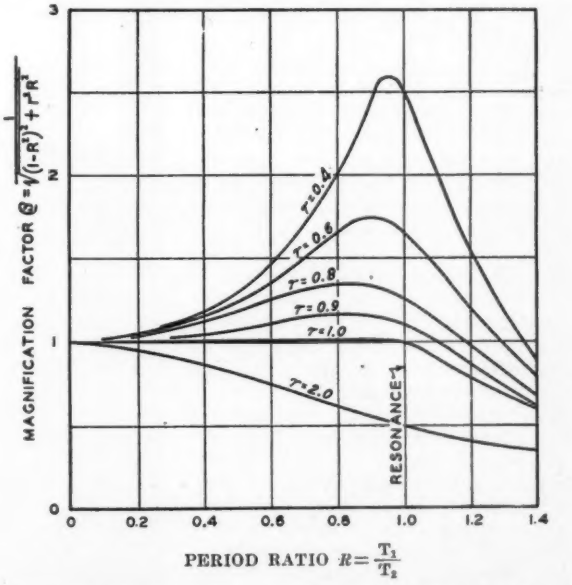

Fig. 2—Magnification factor and period ratio for different values of damping (from "Plunger Travel of Oil-Well Pumps"—R. W. Rieniets, A.P.I. Drilling and Production Practice 1937)

culations of phase angle, and by assuming the damping factor.

$$K, \text{ the spring constant of rods} = \frac{AE}{L}$$

where

A = area of rods
E = modulus of elasticity
L = length of rods, inches

W_f = weight of fluid on plunger

F = rod friction load, pounds. This load can be obtained from a dynamometer card taken at a very slow speed, and equals half of the differential polished-rod load less weight of fluid. This factor can be quite often omitted from the formula.

Langer's formula. — The plunger travel formula, based on theoretical considerations of sucker-rod pump as a problem in longitudinal vibration of bars, is that presented by Langer, Dralle and Lamberger.[5] Conclusions reached are supported by a large number of tests on a single test well with elaborate arrangements for obtaining number of simultaneous records on performance of the pumping mechanism.

The formula, as developed, contains certain factors which are difficult to calculate. For ordinary field use the authors developed a simplified formula in which damping in rod strings is disregarded and constants are readjusted to make the calculated results agree more closely with actual results. The simplified formula is as follows:

$$E.S.P. = \frac{S}{\cos.\ (0.0004LN)^c} - \frac{W_{OD}\,L}{2(10)^6}\left(\frac{1}{A_R} + \frac{1}{A_T}\right)$$

where

E.S.P. = effective plunger stroke, inches
S = polished-rod stroke, inches
W_{OD} = differential fluid load (weight of net fluid head on full area of plunger), pounds
L = length of rod string, feet
A_R = cross-sectional area of rod, square inches
A_T = cross-sectional area of tubing, square inches
N = number strokes per minute

Determination of actual plunger travel from the dynamometer and dynagraph cards will be the subject of the following installment of the series.

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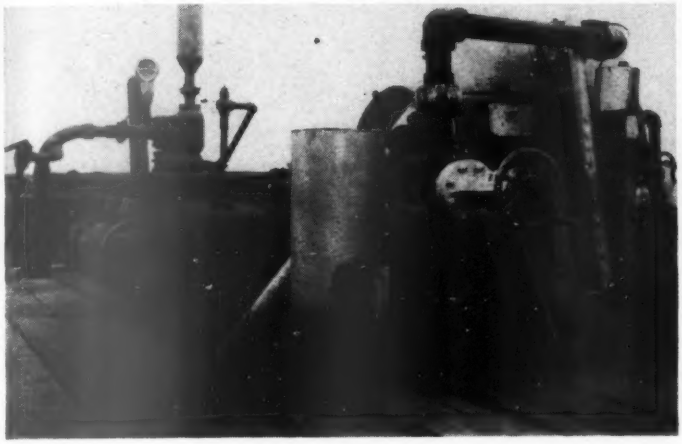
Straightener Press Built From Old Lathe Bed

A STRAIGHTENER press was constructed from a 9-ft. section of an old lathe bed, 3 ft. wide. A portable hydraulic press was fitted to this bed, at its length center, with the press plunger centered over two V's of the bed, the plunger ending in a blunted point of approximately parabolic cross-section. Two pins were fitted to a base fitting on the V of the bed, one on each side of the press. Each roller was cut crosswise with a cylindrical notch to receive the bar or rod to be straightened. Different-sized notches were cut around the circumference of the pins to accommodate the various rod sizes. An air hammer was fitted to the bed, hammer upward, directly beneath the plunger.

In operation, a rod such as a pump rod which has been reconditioned and heat-treated, is placed across the notched rollers, convex side of its curve upward, and the plunger forced down on it by working the hand pump, until the rod is slightly past the straight position. While held in this position the rod is struck one or more sharp blows directly beneath and opposite the plunger, to "set" the rod in position. By withdrawing the plunger and turning the rod on centers fitted to the Vs of the lathe bed, its curvature may be observed and corrected by repetition of the procedure until it is straightened. The bases of the notched rollers are slidable on the V of the bed, to any distance from the plunger position.

OPERATING IDEAS



Safety Guard for Steam-Engine Governor

THE vertical steam engine used to drive the power pump on a steam-saving rotary rig must be equipped with a governor to prevent its overspeeding in case of a faulty valve or piston. This governor is installed on the steam line in front of the throttle valve. The exposed governor would be dangerous to anyone working around the pump so it is covered with a guard made from 12-in. casing. The guard is supported by angle irons bolted to the pump skid.

Elevator for Rathole Connections

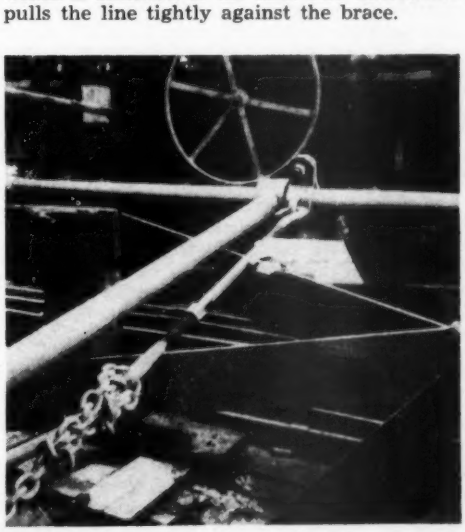
MAKING of rathole connections is practically a standard procedure on rotary-drilling rigs now. However, some support must be provided for the joint hanging in the rathole and most contractors prefer not to have a set of regular drill-pipe elevators tied up in this work. The simple elevator shown serves this purpose very well. The heavy U-shaped strap has an eye for attaching the cat-line and a set of holes for a pin to hold the pipe in place. The end of the pin is hinged so it cannot fall out while the joint of pipe is being lifted. After the connection has been made, the pin can be lifted and the pin pulled from the holes, thus allowing the U-shaped piece to be pulled from around the pipe.

Lease Identification Sign Has Air of Permanence

THIS neat sign identifying the well and location has an air of permanence about it due to its construction and its concrete foundation. Old sucker rods supply the material for the sign frame and support. Setting the sign at eye level is an aid as it is easier to read. Placing the sign away from the well and closer to the road is also helpful as a passerby can more readily see it and obtain his location.

Pump Line Brace Reduces Pounding of Vibration

VIBRATION in the discharge line from the mud pump on a power rig causes considerable breakage. The accompanying photo shows the method used by one contractor to reduce the pounding. It consists of a brace of 4-in. pipe with a saddle on one end placed between the line and the pump skid and a turnbuckle attached to a clamp with an eye which is fastened to the line. The turnbuckle pulls the line tightly against the brace.



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F = rod friction load, pounds. This load can be obtained from a dynamometer card taken at a very slow speed, and equals half of the differential polished-rod load less weight of fluid. This factor can be quite often omitted from the formula.

Langer's formula. — The plunger travel formula, based on theoretical considerations of sucker-rod pump as a problem in longitudinal vibration of bars, is that presented by Langer, Dralle and Lamberger.[5] Conclusions reached are supported by a large number of tests on a single test well with elaborate arrangements for obtaining number of simultaneous records on performance of the pumping mechanism.

The formula, as developed, contains certain factors which are difficult to calculate. For ordinary field use the authors developed a simplified formula in which damping in rod strings is disregarded and constants are readjusted to make the calculated results agree more closely with actual results. The simplified formula is as follows:

$$\text{E.S.P.} = \frac{S}{\cos.\ (0.0004LN)^{\circ}} - \frac{W_{OD}\,L}{2(10)^6}\left(\frac{1}{A_R} + \frac{1}{A_T}\right)$$

where

E.S.P. = effective plunger stroke, inches
S = polished-rod stroke, inches
W_{OD} = differential fluid load (weight of net fluid head on full area of plunger), pounds
L = length of rod string, feet
A_R = cross-sectional area of rod, square inches
A_T = cross-sectional area of tubing, square inches
N = number strokes per minute

Determination of actual plunger travel from the dynamometer and dynagraph cards will be the subject of the following installment of the series.

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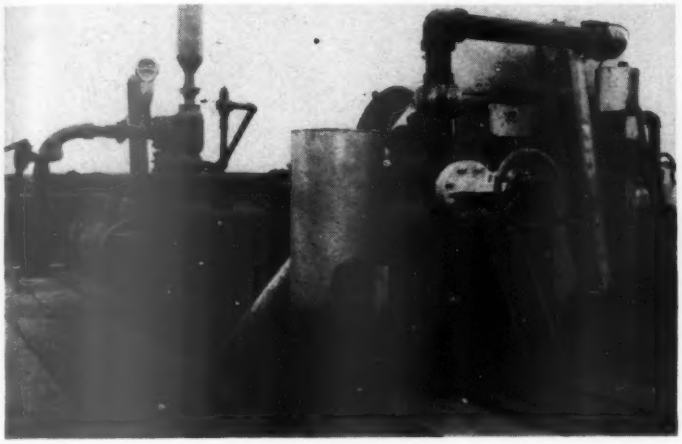
Straightener Press Built From Old Lathe Bed

A STRAIGHTENER press was constructed from a 9-ft. section of an old lathe bed, 3 ft. wide. A portable hydraulic press was fitted to this bed, at its length center, with the press plunger centered over two V's of the bed, the plunger ending in a blunted point of approximately parabolic cross-section. Two pins were fitted to a base fitting on the V of the bed, one on each side of the press. Each roller was cut crosswise with a cylindrical notch to receive the bar or rod to be straightened. Different-sized notches were cut around the circumference of the pins to accommodate the various rod sizes. An air hammer was fitted to the bed, hammer upward, directly beneath the plunger.

In operation, a rod such as a pump rod which has been reconditioned and heat-treated, is placed across the notched rollers, convex side of its curve upward, and the plunger forced down on it by working the hand pump, until the rod is slightly past the straight position. While held in this position the rod is struck one or more sharp blows directly beneath and opposite the plunger, to "set" the rod in position. By withdrawing the plunger and turning the rod on centers fitted to the Vs of the lathe bed, its curvature may be observed and corrected by repetition of the procedure until it is straightened. The bases of the notched rollers are slidable on the V of the bed, to any distance from the plunger position.

OPERATING IDEAS



Safety Guard for Steam-Engine Governor

THE vertical steam engine used to drive the power pump on a steam-saving rotary rig must be equipped with a governor to prevent its overspeeding in case of a faulty valve or piston. This governor is installed on the steam line in front of the throttle valve. The exposed governor would be dangerous to anyone working around the pump so it is covered with a guard made from 12-in. casing. The guard is supported by angle irons bolted to the pump skid.

Elevator for Rathole Connections

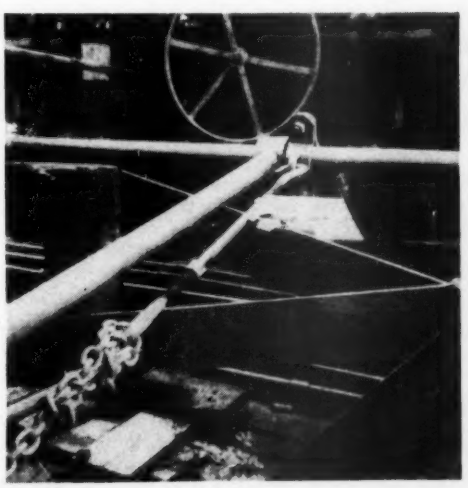
MAKING of rathole connections is practically a standard procedure on rotary-drilling rigs now. However, some support must be provided for the joint hanging in the rathole and most contractors prefer not to have a set of regular drill-pipe elevators tied up in this work. The simple elevator shown serves this purpose very well. The heavy U-shaped strap has an eye for attaching the cat-line and a set of holes for a pin to hold the pipe in place. The end of the pin is hinged so it cannot fall out while the joint of pipe is being lifted. After the connection has been made, the pin can be lifted and the pin pulled from the holes, thus allowing the U-shaped piece to be pulled from around the pipe.

Lease Identification Sign Has Air of Permanence

THIS neat sign identifying the well and location has an air of permanence about it due to its construction and its concrete foundation. Old sucker rods supply the material for the sign frame and support. Setting the sign at eye level is an aid as it is easier to read. Placing the sign away from the well and closer to the road is also helpful as a passerby can more readily see it and obtain his location.

Pump Line Brace Reduces Pounding of Vibration

VIBRATION in the discharge line from the mud pump on a power rig causes considerable breakage. The accompanying photo shows the method used by one contractor to reduce the pounding. It consists of a brace of 4-in. pipe with a saddle on one end placed between the line and the pump skid and a turnbuckle attached to a clamp with an eye which is fastened to the line. The turnbuckle pulls the line tightly against the brace.



Over-all view of Lone Star Producing Co.'s central fractionator unit at Ranger, Tex., separating raw natural gasoline into special fractions

Lone Star's Central Fractionator Concentrates Special Products

by Arch L. Foster

FACED with the problem of the ultra fractionation of products from the natural gasoline produced from six scattered plants, Lone Star Producing Co. decided on the construction of a central plant to which all raw gasoline "make" would be sent for fractionation and stabilization. Under existing conditions a maximum of 150,000 gal. per day of charge, it is estimated, is made by these six plants. All plants had been in operation for several years in the Ranger, Tex., district; the gas production and therefore gasoline production was settled, with all indications of a long and gradual decline in the life of the producing fields.

Remarkable enough but not surprising under emergency conditions is the fact that of the equipment and material used in the plant all of it was second-hand except three large towers and a few incidental items like additional wire for an instrument or two and the smallest number of odds and ends of fittings, etc. Instruments for the entire plant were collected from other plants, shut down or operating at reduced capacity. For a boiler unit four 100 hp. locomotive-type boilers are tied together, reconditioned, and these supply the steam required for the unit. In addition, nine similar boilers are available for standby, with a minimum amount of reconditioning. Two used, 50-ft. by 48-in. 30-plate towers are used as deethanizer and depropanizer, and are giving excellent results.

Four double and five single low-pressure Ingersoll-Rand compressors, belt-driven by Cooper-Bessemer gas engines take suction on the gas gathering system serving the large number of wells in the surrounding fields, and are included within the plant but have no part in the special job handled by the plant. Current for the plant is supplied by a 156 kva. Westinghouse generator, V-velt driven by a Cooper-Bessemer 165-hp. gas engine.

Charge, reflux and other pumps, reflux tanks, intermediate and finished products tanks are all used, formerly employed at this plant—which was a regular compression-absorption unit—or obtained from other plants belonging to the company.

With a battery of five bubble columns, Lone Star Producing Co. breaks up raw natural gasoline into several special fractions, suitable for numerous important purposes. Superfractionation has been used to a considerable extent already in the refining and natural-gasoline industry. This plant's operation is an indication of what may be expected as general practice in future.

The design of the plant and its operation are shown in the accompanying simplified flow chart. The deethanizer tower, first in the operating cycle, is 50 ft. by 48-in., with 30 trays, formerly used as a stabilizer for natural gasoline. The depropanizer is identical; each is equipped with feed pump, reboiler, reflux pump, condenser and accumulator tank.

The debutanizer tower, new, is 70 ft. by 54 in., and has 30 plates. The "butane splitter" tower, also new, is 112 ft. by 36 in., and has 66 plates for the exacting job of separating normal from isobutane, boiling at 31° F. and 14.4° F., respectively, a spread of 17° F. at most. The deisopentanizer has excess fractionating capacity to permit operation under a wide variety of conditions for many different purposes, is 112 ft. by 84 in. The numerous tanks, accumulators, etc., are of conventional design, and the interconnections in the plant are typical of good practice. The unit was built by Gasoline Plant Construction Corp., of Tulsa.

High Fractionating Efficiency

The operation of the plant may be understood best by reference to the

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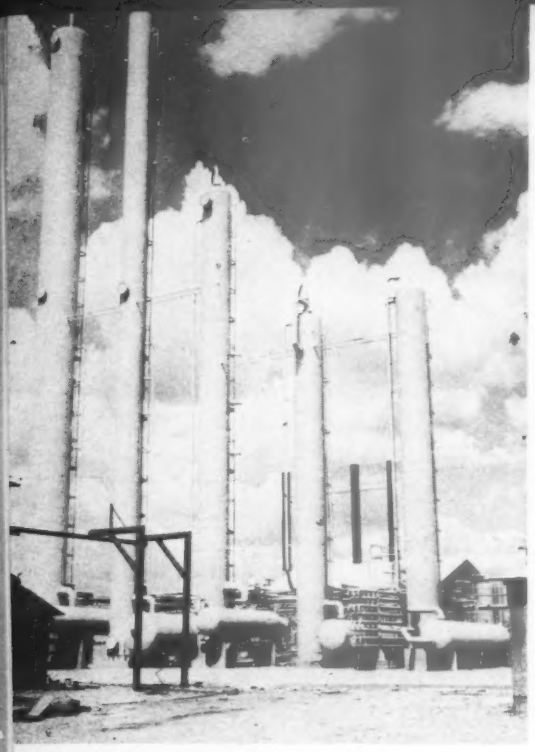


View of the main column battery, showing how compactly the unit is assembled and how easy of access the different pieces of equipment are

accompanying flow chart. An average composition of the charge stock is as follows:

Component—	Volume (per cent)
C_3 and lighter	22.65
iso-C_4	6.95
n-C_4	26.64
iso-C_5	7.98
n-C_5	10.03
C_6 and heavier	25.75
Total	100.00

One of the problems involved in this plant's operation is the variation in charge-stock composition from day to day, almost from hour to hour, and also in the product arriving from different plants. Some entirely expectable difficulty has been experienced, as is normal for a new plant starting up, in maintaining uniformity in products specifications from day to day, because of this variation in charge composition and the difficulty of anticipating these composition changes with automatic controls in time to correct sufficiently on the control mechanisms to maintain uniform products. However, this problem applies to uniformity rather than to meeting specifications. After the first few days of preliminary operation, no considerable problem has been met in meeting the standard specifications on which products are sold.

The charge stock is brought to the plant by two methods; about 75 per cent of it comes via a 4-in. pipe line about 30 miles long reaching from the vicinity of Breckenridge to the plant and a 10-mile line, including 2 and 4-in. pipe, gathering stock from different plants in terminal areas. The pipe used in these lines was second-hand. The remaining 25 per cent—an estimated 35,000 gal. per day, approximately—is brought from the more widely separated plants in the large two-tank, so-called "butane" trucks. According to J. M. Kindle, manager of the plant, it is believed that, for relatively small amounts of gasoline, located or produced in isolated spots too far separated to make the installation of a pipe-line gathering system and main transport line practicable, this trucking system is the most economical method for collecting these quantities of raw products at a given central point.

Blending Charge Stocks

The stock so collected is delivered into raw-gasoline storage tanks, on which the main charge pump takes suction. Six of these tanks are in use, the custom in the past having been to draw charge from a battery of three while the second battery of three are receiving new stock from pipe line and truck. Because of the problem of varying composition, it is planned to handle the stock in the following manner to give greater uniformity of charge.

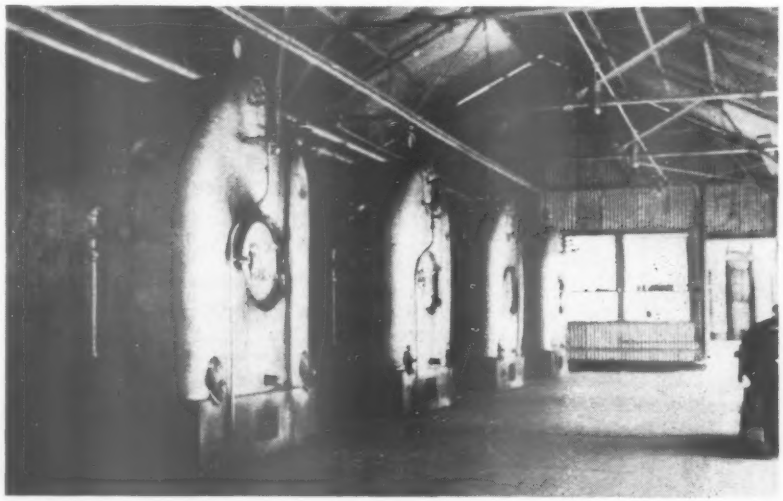
Some of the gasoline coming into the plant has been stabilized (depropanized). Most of that entering via pipe line has not been stabilized. Two of the six stock tanks are to be segregated and into these, each in turn, the receipts of stabilized gasoline for 24 hours, or some other time period, will be stored. During this time period this stabilized portion of the total raw stock will be fed into the system—the charge—and so will iron out the fluctuations in composition to give a more uniform feed stock and thus improve the plant operation, the uniformity of charge and raise the average purity of the products, that is, the efficiency of the fractionation.

Raw charge is passed in heat exchange with the "n-pentane and heavier" bottoms from the large fractionator to preheat the stock which is pushed into the deethanizer tower at about 400 lb. pressure and 275° F. Overhead vapors from this tower, ethane and methane if any of the latter is present, are partially condensed to give reflux liquid, collected in an accumulator and returned to the tower top at a 3:1 reflux ratio. Bottoms liquid is reboiled and pumped to the depropanizer at 250 lb., 140° F. top temperature and 270° F. bottoms temperature. Reflux liquid is obtained by primarily condensing overhead vapors, chiefly propane, and returning it to the tower top in a 3:1 reflux ratio, as is done in the deethanizer. The reboiled bottoms, butanes and heavier, go to Tower 3. The overhead vapors and/or liquid from the first two towers go to plant fuel or to residue gas lines to the field. Propane from the second tower overhead may be devoted entirely or in part to liquefied petroleum gas (bottled gas), as the market demands may be.

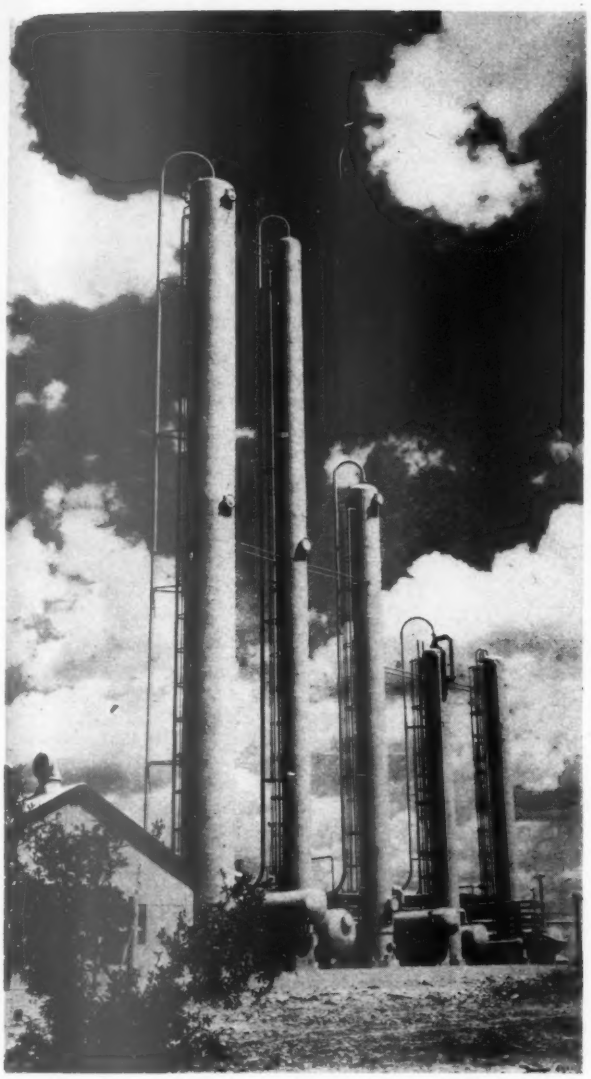
Separation of Isomers

Charge to the third or debutanizer tower enters at 135 lb. pressure and 220° F. temperature, with 165° F. overhead and 275° F. bottoms temperatures. Overhead vapors from this tower include both normal and isobutane, are totally condensed in an accumulator, and reflux in ratio of 6:1 is returned to the tower top. Reboiling of bottoms in this tower, as in the other towers, is by 200-lb. live steam.

The condensed overhead butane mixture is sent to the butane splitter tower at 110 lb. and 145° F. entering temperature, with 135° F. overhead and 165° F. bottoms temperatures. Boiling only about 17° F. apart, the fractionation problem of separating these two products is a severe one,



Battery of four HRT boilers which supply all the steam required by the plant



Fractionating Columns
Lone Star Producing Company
Ranger, Texas, Plant

This is one of several plants having multiple column fractionating equipment which include de-ethanizers, de-propanizers, de-butanizers, de-isobutanizers and de-isopentanizers.

DESIGNED AND CONSTRUCTED BY

GASOLINE PLANT CONSTRUCTION CORPORATION
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Flow chart of central fractionator, showing how the different fractions are obtained and the interrelation between the different steps

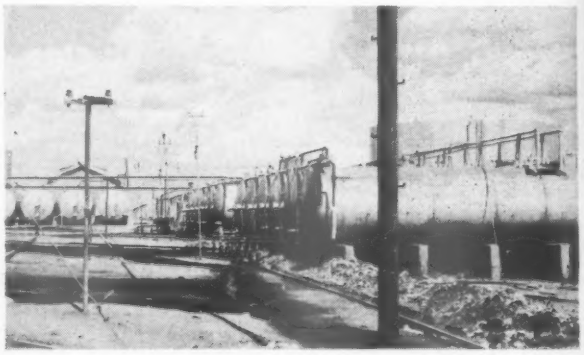
and requires 60 or more plates to accomplish it in the purity required by market standards. Various plants doing this step have used towers of 60 to 70 plates, even up to 100 plates or its equivalent being employed satisfactorily. Much of the efficiency of this step is dependent on the uniformity of charge stock, of cooling-water temperature and quantity, and therefore on the water-cooling system. The cooling system in this plant is an efficient one; with a dry-bulb temperature of 100° F., a wet-bulb temperature of 85° F., as may prevail in the midday period for months during summer, temperature of water issuing from the cooler condensers at about atmospheric temperature will be reduced to within 1° or 2° F. of the wet-bulb temperature.

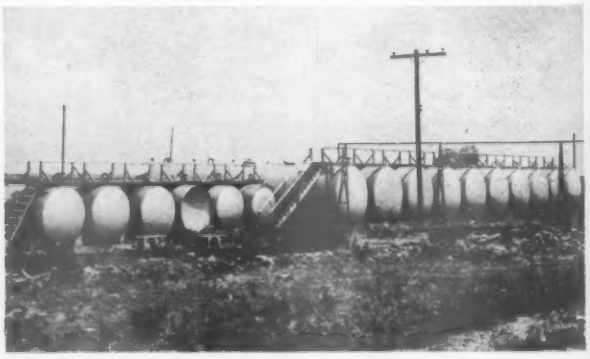
A reflux ratio of 7:1 on this tower yields an isobutane product of 95 per cent or higher purity, the standard specification requiring 95 per cent minimum isobutane content. The normal butane contains only a very small per cent of isobutane and may be stored separately for any number of uses, for isomerization, for bottled gas, or may be blended back with the normal pentane and heavier bottoms from the the fifth tower as shown later.

Bottoms Disposal

The essentially butane-free bottoms from the fourth tower passes, under its own pressure differential—as is the method of transferring between other towers in the battery—to the large final fractionator, at 215° F. temperature and 60 lb. pressure, maintaining 180° F. overhead and 255° F. reboiler bottoms temperatures. The reflux ratio is 14:1 minimum, up to 17:1 being used in occasion.

The isopentane overhead from this tower, made under a 95 per cent purity specification will average 98 per cent or higher under normal operating conditions. Isopentane boils at 82.4° F. It is pumped to storage without further treatment as are all the other fractions all of which are sweet. The bottoms, n-pentane and heavier, are pumped in countercurrent heat exchange with the incoming raw stock and





Above: Three batteries of intermediate and rundown product tanks which serve the plant. Below: Battery of finished product tanks from which the special fractions are shipped

are than sweetened in a Perco solid copper chloride unit.

The steam system in the plant requires 30,000 to 35,000 lb. of steam per hour, at an initial 200-lb. pressure. Also a large proportion of the exhaust steam from the pumps and heaters is used as reboiler medium. The steam system is total condensing, the last of the uncondensed steam from the various parts of the plant entering the feed-water makeup preheater and is condensed therein. Condensate from the various reboilers is picked up from traps by pumps and added to the feed-water stream.

In the operation of such a plant as this, when gross volume throughput may be limited by the maximum size of equipment, pumps, lines, towers, etc., which are available, the problem may be solved and the output of finished product may be increased considerably by depropanizing the raw feed before it leaves each individual plant where the raw product is made. On an average raw charge such as is shown in the accompanying table the elimination of, say, 20 per cent propane will increase the handling capacity of lines and all equipment up to the debutanizer by a corresponding amount, 20 per cent. Relief of a bottleneck in the first two towers or in storage tanks, pumps, preheaters, etc., can easily make the difference between red and black ink in the bookkeeping department of the company. However, in the case of building new gasoline plants, it becomes an economic problem of careful estimation and calculation to determine if deethanization-depropanization is cheaper when carried out in individual units in the field plants or in one large unit in the central fractionation plant. Within certain limits, fractionation in one large unit is cheaper than in several small units, when both the small and/or the large units must be built new, and be paid for out of gross profits. In the case of a large unit already on hand with ample capacity from the raw output it would be uneconomical to build new units at each gasoline plant. If stabilizer towers are available at existing gasoline plants, it will doubtless be cheaper to take off propane and lighter ends at each plant and deliver depropanized product to the central fractionation unit. This plant does both, because of existing facilities.

BOOK REVIEW

FUEL OIL AND ITS COMBUSTION. Published by North American Manufacturing Co., Cleveland, Ohio, 45 pp. $1.50.

This booklet was prepared by the company's research department for users of fuel oil. There is considerable original material presented as well as a scholarly and thorough synopsis of data pertaining to fuel oil.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Tightening of Pipe Joints

We are having trouble in stripping the threads from ½-in. gas line fittings. Are these fittings no good because of the war?—R. C. V.

It is improbable that the quality of malleable iron fittings is inferior because of the war although it is possible that errors may have been introduced because of the urgency of war work and the employment of many new workers.

The common reasons for stripping the threads of malleable iron fittings are:

1. Failure to use pipe lubricant.
2. Pulling up the joint too tightly.

Almost any type of conventional thread compound (pipe dope) will serve as a suitable lubricant, even plain lubricating oil, and hence there is no excuse for failure to use pipe lubricant. The degree of pull up that should be applied to a threaded joint is a more complicated problem. The usual trouble, however, is that the joints are pulled up more tightly than necessary. The taper and design of the threads causes a tremendous pressure to be exerted between the surfaces of the threads, and this pressure can be created by a somewhat small pull on a wrench handle. The Crane Co. has supplied a tabulation of the pull required to produce a tight joint between American Standard taper pipe threads.

Pipe size (in.)	Foot pounds	Example of pull required:
⅛	10	15 lb. on 8-in. handle
¼	20	24 lb. on 10-in. handle
⅜	32	24 lb. on 16-in. handle
½	45	34 lb. on 16-in. handle
¾	65	22 lb. on 24-in. handle
1	95	48 lb. on 24-in. handle
1¼	130	52 lb. of 30-in. handle
1½	180	60 lb. on 3-ft. handle
2	300	87 lb. on 3-ft. handle
2½	360	90 lb. on 4-ft. handle
3	460	115 lb. on 4-ft. handle
3½	600	120 lb. on 5-ft. handle
4	700	117 lb. on 6-ft. handle
4½	850	142 lb. on 6-ft. handle
5	900	150 lb. on 6-ft. handle
6	1,100	184 lb. on 6-ft. handle
7	1,440	240 lb. on 6-ft. handle
8	1,560	260 lb. on 6-ft. handle

The second column designated as foot pounds is the product of the length of the wrench (or lever) and the pull on the wrench handle. Thus, with a long wrench the pull is small and with a short handle the pull required is large.

When the joints are "pulled up" to the extent required by the tabulation, the threads are not damaged in any way. They are not torn or scored, the joint can be disengaged with about the same pull as when making it up, and the fittings are not swaged down or expanded by making the joint. The way that threads are stripped appears to be that the male fitting swages down so that the threads on it are too small in diameter. This permits the small-diameter threads to engage the top of the threads of the female fitting and to cut them off.

To pull up a joint too tightly does no good whatsoever in making the joint tight and tends to damage the threads or dimensions of the fittings. If the threads are not smooth, either because of poor pipe dies or rust, the joint may become frozen so that a large pull is required to disengage it.

Most pipe joints (freshly cut threads) can be pulled up by hand to within one or two turns of being tight. After having been pulled up according to the figures in the tabulation, further tightening can be accomplished to the extent of two or three turns, but this results in damage or stripping of the threads.

Lamie Asphalt Retort

What is the Lamie asphalt retort? I looked through two or three books and was unable to find reference to it. Can you help us out?—G. H.

The Lamie retort is not a well-known equipment but several patents have been issued to Harry S. Reed and R. D. Lamie, which pertain to various retort-like equipments and processes for utilizing them. These patents are British 318373; U. S. 1696731; U. S. 1927219; U. S. 1980828; and U. S. 2009122; and 2022054 November 26, 1935. Most of these apply to the distillation and decomposition of coal but one late patent (1935) pertains mainly to the handling of oils. The other patents might also be useful because they describe the mechanical details and use of the retort.

By this patent the oil is heated rapidly under pressure to a temperature below its cracking temperature, whereupon it is flashed through a control valve into a ball-mill type of retort which is held at a lower pressure and a higher temperature. In the mill the oil is in contact with the metal balls and scraper bodies (usually white cast iron) contained in the mill which are said to serve the purpose of mixing the oil, conducting heat into the oil, and removing carbonaceous deposits by a grinding action. The powdered carbon so produced is discharged by means of a screw conveyor in the end of the mill and the cracked gasoline product issues from the same end. The entire length of the mill is surrounded by furnaces for applying heat through the shell of the mill. A small furnace at the high or oil-entrance end serves to heat the oil to the cracking temperature, a second and longer furnace surrounds the main length of the mill, and a final shorter furnace is employed to attain the final high temperature.

The equipment and process has some advantages but its merit must rest, to a large degree, upon the performance of the somewhat complicated externally heated revolving ball mill.

Lime for Preventing Corrosion

Can you give us technical data on the use of lime to prevent corrosion? We are particularly interested in information on measuring devices and data as to the best means of mixing the lime slurry. We do not have any indicating equipment as a guide to tell whether we are using an excessive amount of lime. Should we use a reciprocating or centrifugal pump for introducing lime?—E. F. B.

The question or questions are beyond the scope of this page—necessitating detailed design layouts and the services of an engineer or consultant.

Lime in the form of hydrated lime is used in amounts of 0.5 to 2 lb. per barrel of feed stock. Corrosion can be decreased markedly without using as much lime as is required to combine with all of the sulfur. This may be due to the fact that all of the sulfur is not present as hydrogen sulfide or other active forms, and to the less active corrosion of very low sulfide gases.

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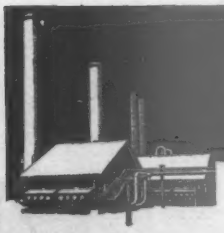

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Gas Journal, December 5, 1929, page 94, report that the use of 1 lb. of lime per 100 gal. of feed stock (0.25 per cent sulfur) decreased the corrosive action by 80-97 per cent. At the same time the sulfide content of the cracked gas dropped fom 150 grains of hydrogen sulfide per 100 cu. ft., to only 20 grains. With another oil of 0.5 per cent sulfur content the sulfide content of the gas was reduced to 50-75 grains per 100 cu. ft. by the use of 1 lb. of lime per 100 gal. feed, and to 20 grains by 2 lb. of lime. Whether the sulfide content of the gas should be reduced to 20 grains per 100 cu. ft. in order to halt corrosion must be dependent on the particular stock and equipment employed, because R. E. Puckett, in The Oil and Gas Journal of September 23, 1937, page 44, states that 0.2 lb. of sulfur per 1,000 cu. ft. of gas (140 grains per 100 cu. ft.) is permissible.

Numerous equipments have been employed in mixing hydrated lime and oil. Some of these employ propeller mixers similar to "Lightening mixers" (even a Ford propeller assembly might be used, The Oil and Gas Journal, June 13, 1935, page 17, but applied to water treating rather than oil) whereas most refiners prepare the lime slurry by pump circulation. Oil (recycle) can be circulated out of a mixing tank by means of a centrifugal pump. Most of the slurry is returned to the tank but a portion may be drawn off through a valve into the pipestill charge line after the hot-oil pump. A few turns or mixing plates in the lime circulation line will care for those rare occasions when a large slug of lime might be carried through the circulation line. The lime-slurry tank is fed occasionally with sacked lime. A better but far more expensive system involves the use of a proportioning pump. The slurry tank and centrifugal circulation line would be the same as above, but the slurry would be injected into the system by means of a small pump, which is actuated by and whose speed is regulated by the hot-oil feed pump. In any case, the slurry tank should be large enough so that batches of lime and oil need be made no oftener than each shift, and so that the new batch will be small (equal or less) compared with the slurry still left in the slurry tank.

Centrifugal pumps are generally superior to reciprocating pumps for such services because of the lack of wearing surfaces and because the discharge line can be "pinched off" or closed without damage.

The most common method of determining the success of sulfide removal is to analyze the cracked gases for hydrogen sulfide, but the method is obviously not entirely suitable because the tests are made intermittently. The actual success can only be determined by examination of the equipment during shutdowns.

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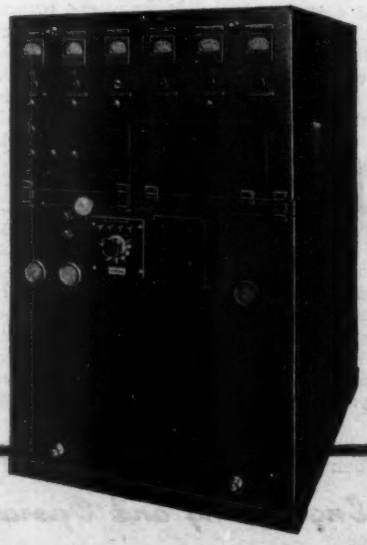

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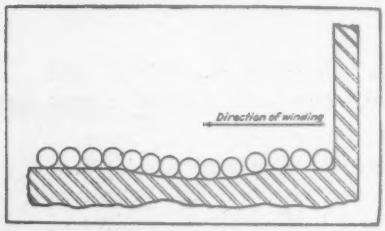
Defective Drum Causes Wire-Rope Damage

IN searching for the source of unsatisfactory spooling on the drum and short wire-rope life the condition of the drum on a rotary-drilling rig is quite often overlooked. If the drum barrel is crushed or deformed in any way it results in a concentration of wear and the cutting through of the under layer by the succeeding layer of turns of the rope. The cutting in of a succeeding layer, i.e., the outer turn of rope forces its way between two turns of the layer or layers beneath, may result in actual snapping of the line if the one operating the machine is not careful.

The layer in contact with the face of the drum forms a uniform helix if the drum is smooth and not damaged. When the rope starts back on the second layer of turns it follows



the turns of the first layer but with each revolution of the drum it must cross over two depressions of the first layer so as to make a net advance of one turn. This is repeated on each of the even-numbered layers and while there is some concentration of wear at the crossover points, no practical way of getting away from it has been devised.

If the bottom-most layer is perfectly wound the succeeding layers will spool with reasonable smoothness. Any unevenness in the bottom layer will cause an unconformity to pattern in each succeeding layer until large enough gaps develop so the overlying turns can cut in. Great care is taken while spooling the first layer on the drum to make sure the line is tight and that the turns are close to each other.

At times, however, the best efforts of the crew are of no avail in getting the turns to stay close together at some particular spot. Generally this is due to a slight unevenness in the drum as shown in the accompanying sketch. As the depression in the drum is approached, the turns spread apart and as the layer begins to come out of the valley, the turns are crowded.

When the next layer arrives at the depression the turns cannot follow the grooves in the first layer so the crowns of the underlying and overlying turns come in contact, and cause crushing of the line; also, because the valley is being entered, there is a tendency for the succeeding turns to spread. As more turns are added and the gaps in the first layer approached, the turns in the second layer have a tendency to cut through and are pinched. The net effect is a flattening of the line in the area where the turns are crowded and severe scrubbing where the bottom turns are spread apart. The abrasion at the crossover points is also severe.

If an examination of the drum shows any deformation it can be repaired by having it turned down or by putting a plate around its circumference.

Fire School Gives Vital Wartime Training

(Continued from Page 60)

Flowing Oil Fires

In flowing oil fires three basic extinguishing procedures generally apply: cooling, smothering and blanketing. Flow of fuel into the fire must be stopped as early as possible to reduce the problem to that of a static fire and to reduce the limitations on the effectiveness of extinguishers. High-velocity flow seriously aggravates the problem of fire control. Air is aspirated into the fire, making it hotter, since the over-all combustion rate is increased.

Demonstrations showed the extent to which extinguishers are less than normally efficient on flowing oils or complicated fires. Water was used principally to show its effectiveness in protective sprays permitting access to close valves; in sprays and streams for the washing away of oils to areas where they may burn out safely; for displacement as a method of stopping oil leaks from bottom outlets of containers.

Organization of Efforts on Complicated Fires

Various procedures were presented in handling complicated fires. As to sequence of extinguishment, it was clearly shown how important it is to put out any ground fire exposing tanks before putting out the tank fire. High-flash oils should be put out first, low-flash last, unless crude tanks are involved. In the latter instance, the crude-oil fires should be extinguished first. Water should be applied continually to keep other oils cool and facilitate their extinguishment.

In using hand hose lines, the water must never be shut off so long as crews are within any area subject to flash back. Streams are so directed as to protect men backing out of such an area. Vision of those working behind water-spray nozzles is obscured by the spray and an observer can often direct them to advantage.

When approaching pressure fires, once the most effective position and direction of streams has been determined, the nozzles must be held steady until the particular action is completed. Each crew must thoroughly understand its duty on each fire. Important part of that duty is to insure the safety of its fellow crews.

Use of Portable Foam Towers

Tank fires beyond handling by other methods may occur where piped foam systems have never been installed or are out of commission. In such cases, portable foam towers and generators will be found highly effective. In some instances such equipment has been found superior to other form protection. It is important to select equipment that is appropriate for the job. Generators should be set up at safe locations at the maximum effective distance from the tower. Every detail should be checked before erection of tower starts. Modern mixing chambers and portable towers are fitted with devices for lowering the foam gently onto the oil. Gentle flow is desirable for all classes of oil and is almost essential for low-viscosity oils such as gasoline and kerosene. A final point to remember is to make sure the fire is absolutely "cold" before picking up equipment.

Exchange of Experience Valuable

Fire prevention and control is said to be an empirical science, learned primarily through bitter and costly experience analyzed from the basis of a sound practical engineering background. It is unlikely that the management of any individual oil plant ever has to deal with a sufficient number of fires to prepare it for what may happen in any plant. By the same reasoning, no fire-prevention engineer in one company has enough experience of his own to develop for him an adequate professional background. But by an exchange of experiences among engineers of different companies a more comprehensive technique can be developed. This has been taking place for several years among men responsible for fire protection and control in Pacific Coast oil companies. As a result they have been able to put together a method of teaching it, which has been one of the principal objectives of the school. Armed with such a "curriculum," other qualified engineers are able to teach fire prevention and control to those who have little or no proficiency or knowledge of the fundamentals involved. Spread of this training and knowledge among an ever-growing number of oil employes should continue beyond the war period. Such a program should aid greatly in the saving of life and property and contribute much in the form of favorable employe and public reaction.

CALCULATION OF FUTURE RECOVERY

AFTER a well has been drilled, two factors determine the amount of profit to be made—one is the ultimate oil recovery, and the second is the time and expense required to obtain this recovery. The question of ultimate recovery enters into the economic picture over the whole life of the well and exerts a large influence on every decision regarding installation of equipment, reconditioning and other work.

Consequently most operators keep more or less detailed data from which the expected ultimate oil recovery from any well can be estimated. In the case of wells producing only small quantities of water and where the oil production follows a rate-decline curve, the future oil recovery can be estimated, often with a reasonable degree of accuracy.

Recovery Curves

Other wells, producing large quantities of water during their productive life and with no appreciable decrease in bottom-hole pressure, exhibit recovery curves which vary over a wide pattern. Recovery curves for such wells customarily are plotted as "per cent oil in total fluid vs. cumulative oil production," since the economic limit of production depends upon the lowest percentage of oil which can be lifted profitably to the surface.

These recovery curves ordinarily are plotted on either cartesian coordinate or semilogarithmic graph paper and in many instances the trend follows a straight line plot. After the trend has been established, mathematical equations can be used to determine the ultimate recovery; however, the most simple and usual method is to extrapolate the curve and read the ultimate recovery figure direct from the chart.

Calculating Recovery

Fig. 1 illustrates a recovery curve for Well A, the general trend of the curve being a straight line on the cartesian coordinate graph. The economic limit of production is assumed to be 1 per cent oil in total fluid and the extrapolation indicates that the ultimate recovery will be 99,000 bbl.

The mathematical equation for this curve is:

$$y = mx + 100$$

where y = per cent oil in total fluid, x = cumulative oil in bbl. (from time of first water), $m = \frac{y_2 - y_1}{x_2 - x_1}$ and x_2y_2, x_1y_1 are any two points on the straight line.

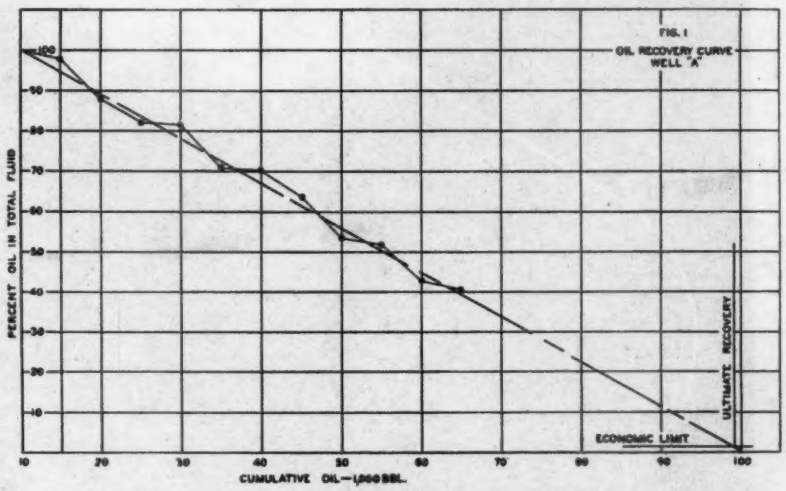
A recovery curve for Well B is shown in Fig. 2. The general trend of this curve is a straight line on semilogarithmic paper. The economic limit is assumed to be 1.8 per cent oil in total fluid and the extrapolation shows an ultimate recovery of 130,000 bbl. of oil plus the cumulative oil produced prior to water encroachment.

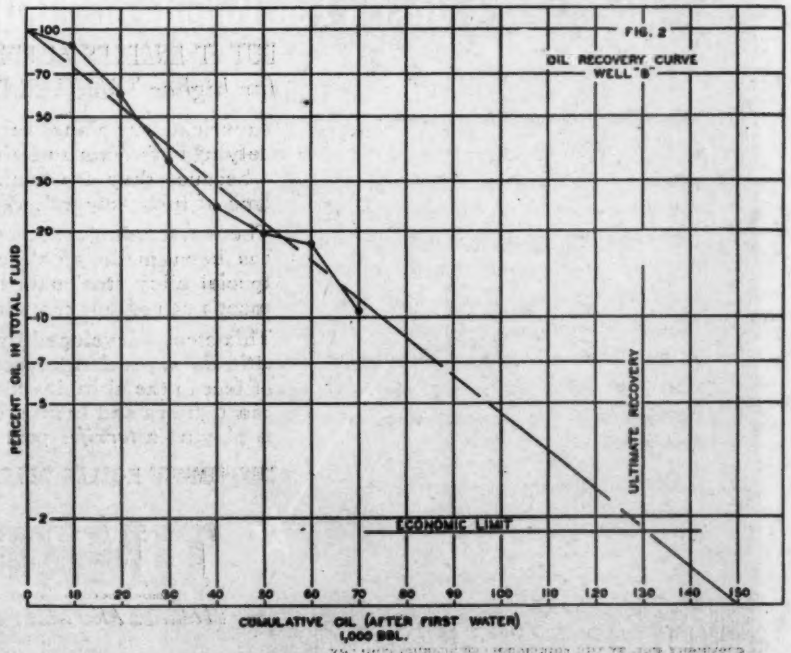
The mathematical equation for this curve is:

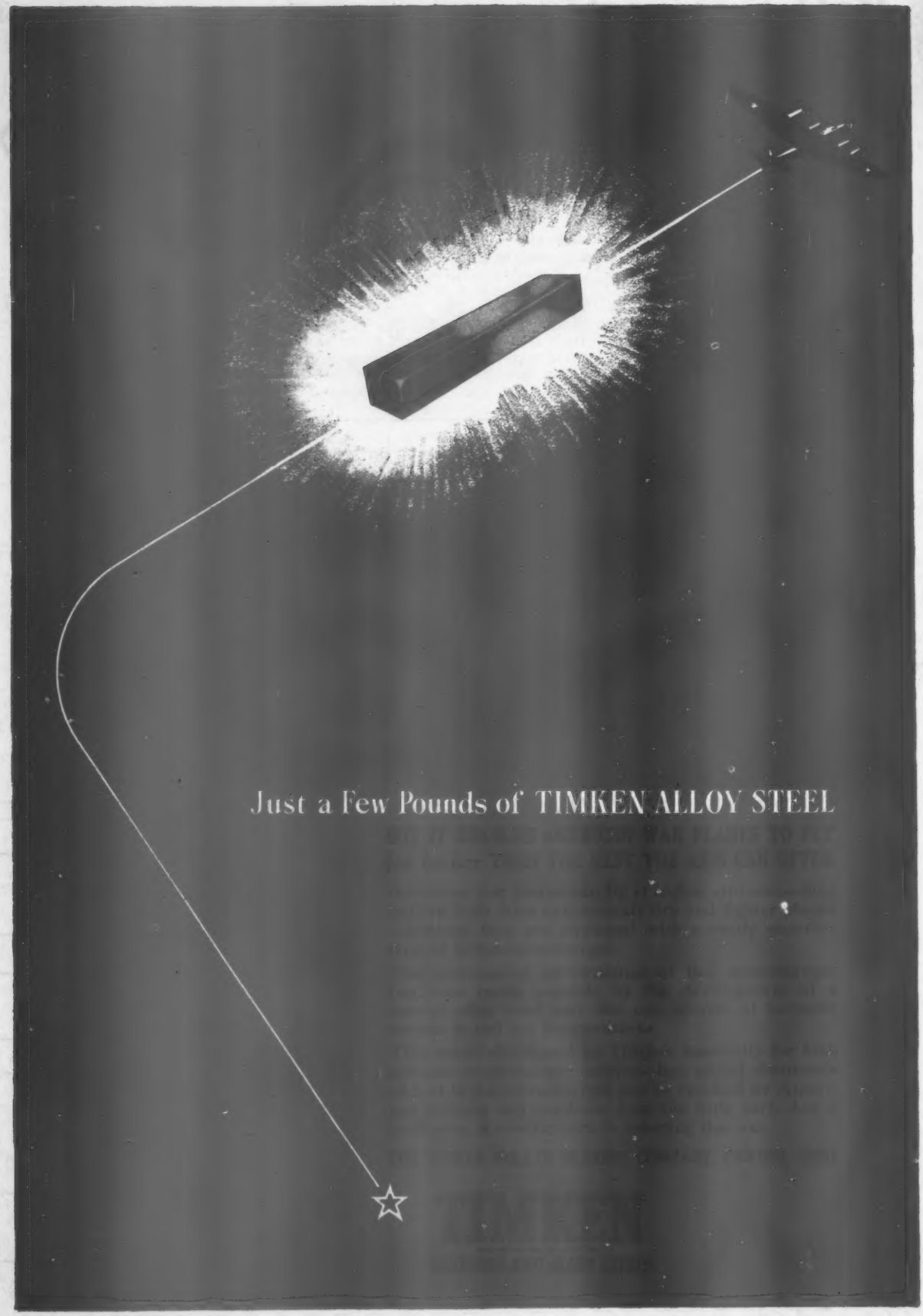
$$y = C\,e^{-kx}$$

where y = per cent oil in total fluid, x = cumulative oil production after first water encroachment, C = value of y when x = 0 and

$$k = 2.303\left(\frac{\log_{10}y_2 - \log_{10}y_1}{x_2 - x_1}\right)$$



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Engineering Fundamentals No. 102

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

DETERMINATION OF EFFECTIVE POROSITY

THERE are several methods that have been devised for determining the effective porosity of core samples. Two methods which are widely used because of their simplicity and rapidity are described here.

Washburn-Bunting method. — This method was first described in 1922.* Certain revisions have been made in this method since its inception that have made it more useful and accurate for use in routine testing of oil and gas sands. The method as described here will represent the manner in which it is commonly carried out at the present time.

The principal item of apparatus employed is illustrated in Fig. 1. It consists of a core chamber A in which a sample may be placed by separating the ground-glass joint B. The capillary tube C is graduated to 0.5 cc. divisions. A stopcock D is provided at the top of the capillary tube. The graduations on the tube C read in a downward direction beginning with zero at the stopcock and covering a range of about 3.5 cc. The apparatus contains mercury the level of which can be lowered or raised by moving the mercury reservoir E downward or upward. The mercury reservoir E is connected to the lower end of the core chamber A by means of a flexible rubber tube F.

Briefly, the method consists of placing the core sample in the chamber A, raising the mercury level above the stopcock D, closing the stopcock D, lowering the mercury level to allow escape of air from the sample to above the mercury level, again raising the mercury level above the core sample, and reading at atmospheric pressure in the capillary tube C the volume of air thus extracted from the core. This air volume represents the effective pore volume of the core sample.

The exact detailed procedure will now be described.

The apparatus is thoroughly cleaned and clamped in a vertical position to a ring stand or other similar support. It is then filled with sufficient clean mercury that the mercury level can be raised above the stopcock D by raising the mercury reservoir E, but not enough mercury to overflow the mercury reservoir when the mercury level is lowered to a point just above the connection of the rubber tubing F to the porosimeter.

*Washburn, E. W., and Bunting, E. N., Jour. Amer. Ceramic Soc., 5, 48-56, 112-129, 527 (1927).

Correction Volume

Before placing the core sample in the apparatus it is necessary to determine a "correction volume," because of the air that clings to the glass surfaces inside the apparatus. To do this, the stopcock and the ground-glass joint should be greased with a thin coating of stopcock grease and put tightly in place by rotating each about three turns to give even distribution of the grease in the joint.

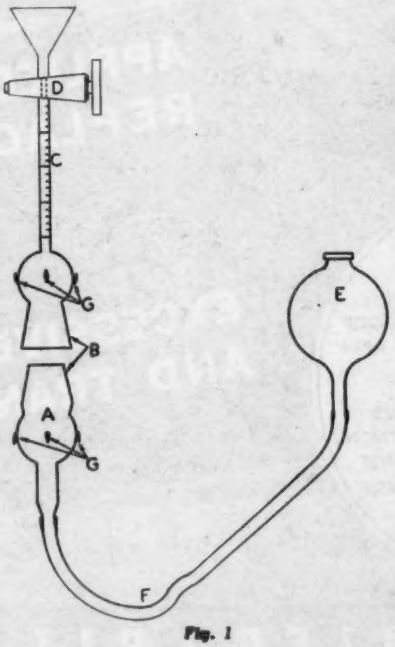

Fig. 1

Glass lugs G are provided on each side of the joint so that rubber bands can be placed across the joint to hold it tightly together and aid in the prevention of leaks. The rubber bands are placed on. The mercury reservoir is raised until the mercury level is above the stopcock and the stopcock closed. Now the mercury reservoir is lowered until the mercury level is just above the rubber tubing connection and held there a few seconds. During this procedure it will be noted that little bubbles of air escape from the surface of the glass just below the surface of the mercury as the vacuum is produced due to lowering the mercury reservoir. Now, the mercury reservoir is raised until the surface of the mercury in the reservoir is at the same level as the mercury surface in the capillary tube C, and the air volume read on the graduations. Without lowering the mercury reservoir the stopcock D is opened and the mercury level raised above the stopcock to displace the air. The stopcock is again closed and the procedure of lowering the mercury level and reading the air volume is repeated. Two or three "reversals" in this manner should be sufficient to get all of the air from the glass surfaces, assuming that there is no leak through any of the joints. The total air volume obtained in this way is recorded as the "correction volume."

The core sample, that has been previously extracted, dried, trimmed to proper size, and brushed of loose grains, is now placed in the core chamber A by disconnecting the ground joint. The joint is again carefully sealed with stopcock grease and the rubber bands placed on.

The mercury reservoir is raised with the stopcock open until the mercury level is above the stopcock. It is noted that this will trap the air contained in the pore spaces of the core below the mercury level. Now, the stopcock is closed and mercury reservoir lowered as when determining the correction volume. Lowering of the mercury level below the sample in this manner exposes the sample to

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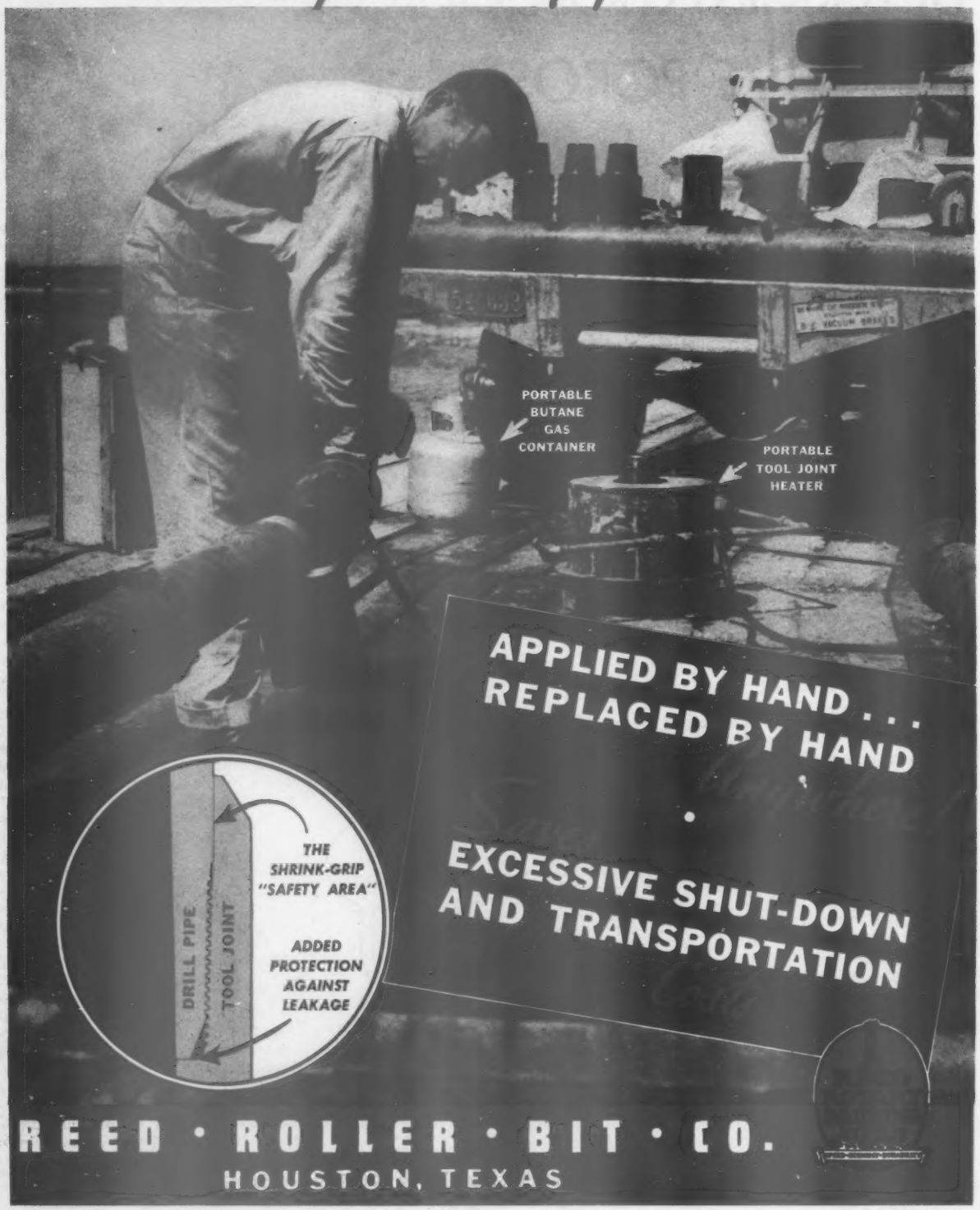

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a partial vacuum and allows the air contained in the connected pore space of the sample to expand and fill the space above the mercury level. Now, the reservoir is raised trapping this air below the closed stopcock where its volume can be read at atmospheric pressure which is the same pressure that the air was under when first trapped below the mercury level.

The same procedure is repeated until no more air is trapped. If a readable air volume continues to be in evidence after several repetitions of the procedure, an air leak is indicated and the procedure must be repeated with another sample. The total of the air volume readings obtained from a sample represent its pore space plus the correction volume.

The bulk volume of the sample is now determined using a steel pycnometer, mercury, and aluminum beaker as described in connection with the modified Melcher-Nutting method of absolute porosity determination in Installment 101 of this series.

Finally, the effective porosity may be computed from the test results using the following equation:

$$P = \frac{V_p - V_c}{V_b} \times 100$$

where

P = effective porosity, per cent.
V_p = total of air volumes obtained when sample was in apparatus, cc.
V_c = correction volume, cc.
V_b = bulk volume of sample, cc.

It has been found that repeated determinations on the same sample will not check because of the fact that mercury enters the pore space during the first determination. Thus, a later determination gives a porosity value that is low. So, in case a certain determination must be repeated, due to a leak or other difficulties, a fresh adjacent sample should be used.

Wet-and-dry weight method.—This method requires the use of a suction flask arrangement as was illustrated in Fig. 2 of Installment 101 and described in connection with the Russell method of determining absolute porosity.

An extracted and dry sample of suitable size to get in the suction flask is brushed to remove loose grains. It is then weighed very accurately on an analytical balance.

The sample is then placed in the dry suction flask. Clean kerosene or tetrachlorethane is placed in the separatory funnel of the suction flask arrangement. The vacuum pump is operated until nearly a perfect vacuum is present in the flask.

The stopcock of the separatory funnel is then opened to allow the liquid to flow into the flask and saturate the evacuated sample. The sample should preferably be left in the liquid for several minutes to insure complete saturation of the connected pores.

In the meantime the density of the kerosene or tetrachlorethane used should be determined. This may be done with a hydrometer, a Westphal balance, or by direct weighing of a certain volume on an analytical balance. The last method is preferable because of the higher degree of accuracy that is possible. Maintenance of a common supply bottle of liquid for this use will eliminate the necessity of the density determination each time a porosity is measured. However, it should be kept in mind that the density of such liquids changes with temperature, and the density measurement should be carried out with the liquid at very near the temperature at which the porosity determination is made.

The saturated sample is removed from the suction flask and any excess liquid shaken or blotted from the outside of the sample. The sample is then immediately weighed on an analytical balance.

The bulk volume of the wet sample is then measured using mercury, a pycnometer, and aluminum beaker, as described in connection with the Melcher-Nutting method of absolute porosity determination in Installment 101 of this series.

Now the volume of the effective pore space may be calculated using the following equation:

$$V_p = \frac{W_w - W_d}{D}$$

where

V_p = volume of pore space, cc.
W_d = weight of dry sample, gram
W_w = weight of wet sample, gram
D = density of liquid used to saturate sample, gram per cc.

And the effective porosity may be calculated using the equation:

$$P = \frac{V_p}{V_b} \times 100$$

where

P = effective porosity, per cent
V_b = bulk volume of sample, cc.

Due to the fact that there are several possible methods for porosity the question arises as to which is the most appropriate for use in routine core analysis. Needless to say, opinions differ on this point. Some analysts neglect the difference that may exist between absolute porosity and effective porosity and use an absolute porosity method even though the application of the data involves a consideration of only the effective rather than the total pore space. This practice is followed generally because it results in quick determinations with a sufficiently high degree of accuracy. This trend is illustrated by a report of Pyle and Sherborne* who describe a porosity method involving the determination of bulk volume by mercury displacement in a special glass volumeter and the determination of grain volume of the same sample by displacement of tetrachlorethane in a graduated glass tube. From the two measurements the porosity (absolute) can be calculated. Results are thus rapidly obtained and are considered sufficiently accurate.

On some sands, the stoppage of pores by cementing material may cause wide divergence between effective and absolute porosity. In dealing with such sands, it is felt desirable to use effective porosity methods rather than absolute porosity methods.

As to the relative merits of the two methods described in this installment, it is felt there is little difference. Testing of the same samples by the two methods has indicated that the Washburn-Bunting method gives a slightly higher porosity value, in most cases, than the other method. It is believed that this can be explained by the fact that air can be extracted from smaller pore openings than a liquid such as kerosene or tetrachlorethane can enter. Thus, a greater part of the total pore space is measured by the air-extraction procedure of the Washburn-Bunting method. Because of this possible variation in the porosity values obtained by various methods, any field study in which comparative porosities from various wells are involved, it would be advisable to use the same method of porosity determination on all samples.

*Pyle, H. C., and Sherborne, J. E., Pet. Dev. and Tech. 1939, A.I.M.E., pp. 33-61.

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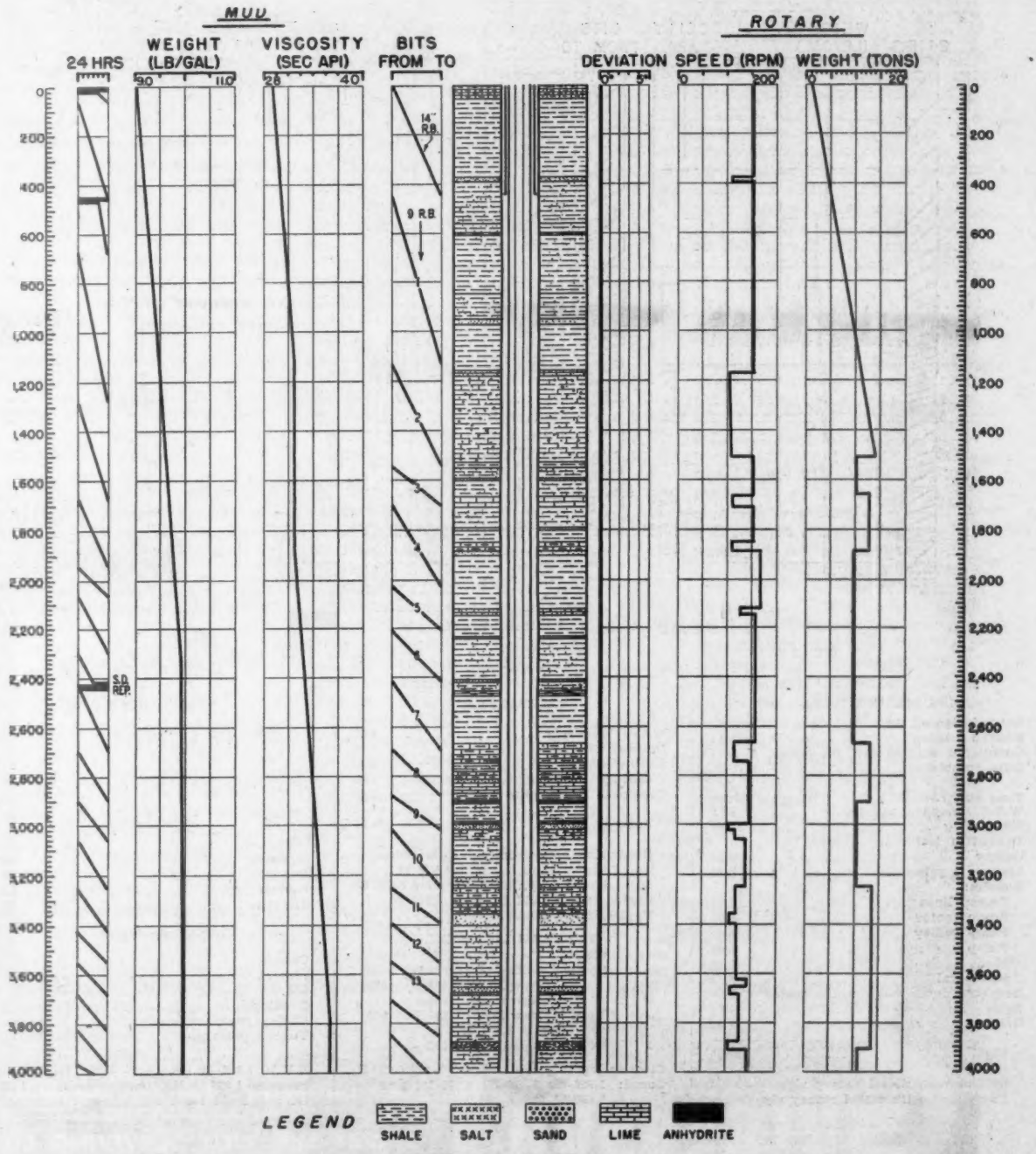

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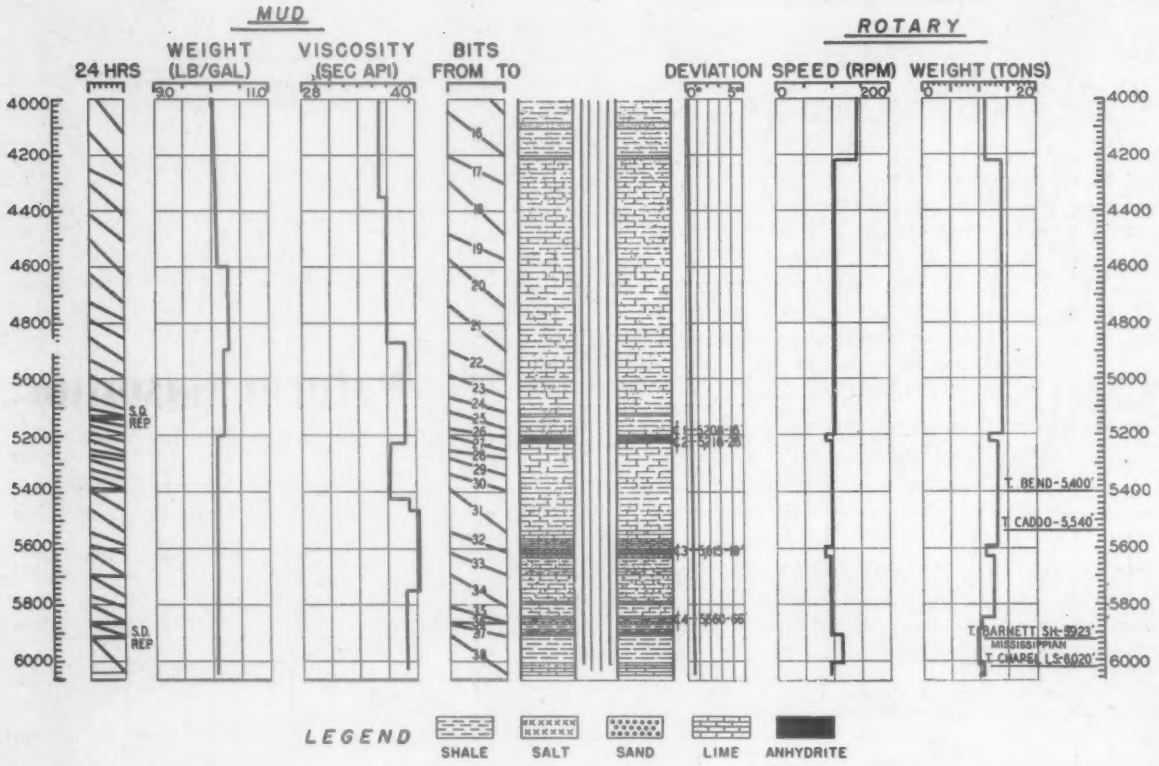
Journalog

Discovery Well, Stephens Pool, North Central Texas (Continued)



DRILLING DATA

Started rigging up	2-20-43
Started drilling	2-22-43
Completed drilling (set oil string)	5- 5-43
Date completed	5-15-43

Time Record	Days
W.O.C. (surface pipe)	2.75
Circulating	2.90
Drill-stem tests (2)	1
Coring	3.45
Electric logging	0.35
Repairs:	
Frozen lines	1.25
Pump motor	0.00
Pump pulley	3.00
Pump	3.00
Mud	1.00
Incidental	4.25
Breaking down and running casing	1.00
Trips	4.65
Drilling	37.50
Total	72.00

Drilled with diesel rotary rig.
Completed with diesel rotary rig.

COMPLETION

	Days
W.O.C. and R.U.	4.00
Drilling plug	1.00
Killing well	2.00
Washing in	1.00
Checking well's production	2.00
Total	10.00

Producing zone: Chapel lime (Miss.)
Top Chapel: 6,010 ft., SLM 6,020 ft.
Total depth: 6,049, SLM cor. from 6,037 ft.
Casing (7-in.) 6,011 ft., SLM 6,021 ft.
Pay: 6,021-49 ft.

TUBULAR MATERIAL

Size (in.)	Weight (lb./ft.)	Type	Feet	Cement sacks
10¾	32.75	New SS	445	275
7	24.00	New H-40	5,589.8	
7	24.00	New J-55 (set at 6,021 ft.)	366.7	500
2	4.70	New J-55	6,032	...

Electric log to ..... 6,037 ft.
Cored: 5,208-16; 5,216-26; 5,515-19; and 5,860-60 ft.

BITS USED

No.	Size (in.)	Type
1	14	R.B.
37	9	R.B.
1	6¼	R.B.
4	6¼	C.H.

MUD USED

Type—	Sacks
Aquagel	388
Baroid	150
Baroco	21
Stabilite	16

PRODUCTION

Choke	18/64-in.
Flowed	3 hr.
Oil	48.77 bbl.
Gravity	48.6° cor.
Casing pressure	1,225 lb./in.²
Tubing pressure	300 lb./in.²

B.H.P. 2,842 lb./in.² at —5,036 ft., tubing pressure 1,037 lb./in.², casing pressure 1,800 lb./in.², fluid level 200 ft. from surface.

Natural Gas

Gas Interests to Be Sold By SEC Decree

DENVER, Colo.—The Securities Exchange Commission's decree ordering Cities Service Power & Light Co. to divest itself of the ownership and control of Public Service Co. of Colorado under the Holding Company Act will involve the last-named company's ownership of 15 per cent stock interest in the Colorado Interstate Gas Co., which transports gas from the Texas Panhandle to Colorado, and the Colorado-Wyoming Gas Co., a wholly owned subsidiary which transports the Texas gas from Denver to Cheyenne. A bill was introduced in the last session of the Colorado Legislature authorizing the creation of a power authority which would enable the state to acquire the Public Service Co. properties. The opposition was so strong that the measure failed to make any progress, but an interim committee was appointed to investigate and report back to the next meeting of the general assembly. In the meantime, application probably will be made for a rehearing on the order to sell the properties, and before the sale finally takes place it is expected that the matter of the state going into the power business will be revived.

Work of A.G.A. Testing Laboratory Is Praised

The American Gas Association Testing Laboratories have completed important war work with "unusual efficiency and dispatch," according to government authorities in charge of the program. In a recent letter to Arthur F. Bridge, president of the association, Dr. James B. Conant, acting director, Office of Scientific Research and Development, Washington, D. C., comments as follows:

"Not only have the personnel shown thorough competence in the field of gas engineering, to which the problems belong, they have also resisted to an unusual degree the temptation to undertake the large number of related problems with which they incidentally became acquainted, but which did not constitute a necessary part of the task assigned them. As a result, their work was done rapidly and economically, and I am informed that negotiations for procurement of the apparatus by our armed forces are already under way."

Hearing Set on Columbia Group Merger Plan

PHILADELPHIA, Pa.—The Securities and Exchange Commission set September 8 for a hearing on an amended application of Columbia Gas & Electric Corp. and its eight subsidiaries comprising its Pittsburgh group for the consolidation of four subsidiaries and the dissolution of the fifth, Fayette County Gas Co.

The Manufacturers Light & Heat Co., Manufacturers Gas Co., Pennsylvania Fuel Supply Co., and Greensboro (Pa.) Gas Co. propose to consolidate and merge to form a new corporation known as the Manufacturers Light & Heat Co., with an authorized capital stock of $37,550,000, representing the aggregate capital stock of the four corporations.

The new company, which will acquire all assets and liabilities of the four companies, proposes to issue and deliver 581,660 of its 751,000 shares of $50 par value common stock to stockholders of the consolidating corporations.

The new company is to assume all liabilities and acquire all assets of Fayette in exchange for 19,556 shares of common stock, whereupon Fayette will dissolve and distribute shares of the new corporation to its stockholders as a liquidating dividend.

Other subsidiaries in the Pittsburgh group joining in the application are the Gettysburg Gas Corp., Cumberland & Allegheny Gas Co. and Natural Gas Co. of West Virginia.

WPB Appoints Gas Advisory Committee

The War Production Board last week announced the formation of a Natural Gas Allocation, Conservation and Curtailment Industry Advisory Committee, with Paul R. Taylor, the government presiding officer.

Committee members are: B. C. Adams, president, Gas Service Co., Kansas City, Mo.; Thomas H. Allen, president, Memphis Light, Gas & Water Division, Memphis, Tenn.; F. M. Banks, vice president, Southern California Gas Co., Los Angeles, Calif.; John W. Batten, vice president, Michigan Consolidated Gas Co., Detroit, Mich.; Walter C. Beckjord, vice president, Columbia Gas & Electric Corp., New York; George Parker, vice president, Mississippi River Fuel Corp., St. Louis, Mo.; J. French Robinson, president, East Ohio Gas Co., Cleveland, Ohio.

United Gas Proposes to Acquire Willmut Line

With the approval of the Securities and Exchange Commission, United Gas Pipe Line Co. proposes to acquire from Willmut Gas & Oil Co. a natural-gas pipe transmission line extending a distance of approximately 8 miles from the Jackson gas field in Mississippi to Hattiesburg, Miss., for the sum of $350,000.

United Gas Pipe Line Co. is a wholly owned subsidiary of United Gas Corp., a subsidiary of Electric Power & Light Corp.

The company is engaged in the transmission and sale of natural gas at wholesale.

Natural Gasoline

Natural Gasoline Demand Jumps 4,500 Bbl. Daily

The demand for natural gasoline and associated products in the United States in June jumped to 259,000 bbl. daily according to the latest report of the Bureau of Mines. This was an increase of 4,500 bbl. daily compared to May and 20,000 bbl. daily compared to June, 1942. Of the June demand, 242,000 bbl. daily was supplied by natural-gasoline plants, cycling plants and associated operations; 9,000 bbl. daily represented liquefied gases at refineries and 8,000 bbl. daily was withdrawn from storage.

In the distribution of the June production, 170,000 bbl. daily went to petroleum refineries, 18,000 bbl. daily to jobbers and blenders, 33,000 bbl. daily for use as liquefied gas and 33,000 bbl. daily represented exports and losses.

Texas Panhandle Output Averaged 23,981 Bbl. Daily

AMARILLO, Tex.—Production of natural gasoline and butane-propane liquid hydrocarbons averaged 28,277 bbl. daily in the Panhandle during June. Natural-gasoline production averaged 23,981 bbl. daily and butane-propane output averaged 4,296 bbl.

There were 39 natural-gasoline plants operating during the month. Recoveries of natural gasoline averaged 0.613 gal. per 1,000 cu. ft. of natural gas processed through the plants.

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District Offices in Principal Cities

REFINING

PAW Orders Increased Gasoline Production

WASHINGTON, D. C. — Increased production of gasoline in Districts 1, 2 and 3 has been ordered by the Petroleum Administration for War, beginning immediately.

In telegrams sent to all refiners in the three districts PAW directed them to increase their yield of motor gasoline by at least 3 per cent and distillate fuel 2 per cent on crude charged over the corresponding percentage yield during the 6 months ended June 30, 1943, this increase to be made at the expense of residual fuel oil.

The telegrams stated that refiners are now governing their operations by the over-all supply of petroleum products as a result of improved transportation facilities, and that at present there is an increased need for gasoline and distillate fuels in Districts 1, 2, and 3 requiring a temporary reduction on the percentage of residual fuel produced. Refiners are instructed not to reduce their production of critical petroleum war products, and 87-octane aviation gasoline is now classed as a critical war product. The production of 80-octane all-purpose gasoline and aviation and heavy-duty lubricating oils is also not to be reduced.

New Butadiene Unit Nearly Ready for Operation

EL DORADO, Ark.—A new unit to manufacture butadiene from raw materials available at its 19,000-bbl. refinery here will be in operation this month, according to an official announcement of the Lion Oil Refining Co. The operation involves a new process. The unit was largely built from materials and equipment salvaged from shutdown refineries and junkyards.

Army Revises Motor-Fuel Specifications

WASHINGTON, D. C.—All types of motor fuel sold for military use on and after September 1, 1943, must pass a modified oxidation stability test, it has been announced by the War Department.

The amended specifications establish a maximum pressure drop of 2 lb. per sq. in. in 7½ hours. Otherwise, the procedure remains the same as under the original Specification 2-103A dated March 2, 1942. The new requirement affects all three types of 80-octane gasoline.

A survey conducted by the Petroleum Administration for War indicated that inhibitor supplies would be ample enough to permit inclusion of such a requirement in the specifications for military fuel.

Michigan Interests Buy Continental Refining Stock

OIL CITY, Pa.—West Branch, Mich., interests have purchased 50 per cent of the outstanding stock of Continental Refining Co. which operates a 1,000-bbl. refinery here. The plant is equipped with a cracking plant which the company operates in conjunction with Pennzoil Co. and Quaker State

Oil Refining Corp. The company which was founded in 1874, is an important producer of aviation lubricating oils and microcrystalline wax. R. G. Lichtenstein of West Branch is moving to Oil City to assume the duties of executive vice president of the company and James P. Dunnigan, president of Producers Refining Co., of West Branch, will serve on the board of directors and as refinery consultant of the Pennsylvania company.

Max Miller Heads New PAW Division

WASHINGTON, D. C.—Organization of an expanded construction division whose principal functions will be to expedite the construction of the 100-octane aviation gasoline plants was announced today by Acting Petroleum Administrator for War Ralph K. Davies.

Max B. Miller, formerly chief of the construction section of PAW's Refining Division, is director.

Entire responsibility for all phases of the 100-octane program, except construction, remains vested in the Refining Division.

Mr. Davies announced the appointment of the following personnel for the construction division, most of whom had worked for PAW as members of the construction section of the Refining Division:

George Gibson and M. B. Fitzgerald, assistant directors; E. H. Kares, director in District 1 (East Coast); J. E. Rouse, director in Districts 2 and 4 (Midwest and Rocky Mountain States); D. P. Sturges, director in District 3 (Southwest); and George Prussing, director in District 5 (Pacific Coast).

Section chiefs with headquarters in Washington are:

Dr. R. Reuter, chemical section; O. J. Thompson, compressor section; L. F. Connell, controlled materials section; H. Clark Goodman, emergency rating section; V. E. Sicks, heat exchanger section; W. K. McCoy, instrument section; B. K. Wherry, power section; Smith C. Bean, labor requirement section.

J. E. Huges, pressure vessel section; R. P. Wilson, priorities section; and E. E. Kerns, pump section; C. V. Marks, redistribution section; and M. C. Jacobs, valves and fittings section. Joseph E. Edridge is administrative assistant.

Lt. Comdr. G. N. Jackson, U.S.N., has been assigned to PAW as Navy liaison officer. Commander Jackson will be on full-time duty, assisting the construction division in working out material problems that involve both the Navy and PAW.

Mr. Miller is known throughout the country as a refinery construction expert. He has been a construction engineer since 1909.

Bureau Chief Says Gasogene No Gasoline Substitute

WASHINGTON, D. C.—Gasogene, a motor fuel which is produced by burning charcoal, has no possibilities as a substitute for gasoline in this country according to H. C. Dickinson, heat and power unit chief of the Bureau of Standards, who added: "There is nothing in sight that will take the place of petroleum—even though eastern motorists were willing to pay $2 a gallon for it."

Rado Refining Co. Will Build Gathering System

The Rado Refining Co., with a 1,000-bbl. refinery at McAllen, Tex., has completed arrangements to build a pipe-line gathering system connecting its plant with fields in Hidalgo and Starr counties, Texas. The system of the Rado company will be connected to a pipe line of Continental Oil Co. and surplus crude supplies will be tendered to that company.

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STURTEVANT PLANOVANE FANS for a variety of exhausting and conveying jobs

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Because of Sturtevant streamlined inlet and controlled-angle flow (shown in the diagram) Design 3 Planovanes are especially suited for industry's "dirty work". These design features reduce slipstream turbulence and cut down wheel erosion. Particle-laden air or gas entering the fan is instantly deflected away from the center, hitting the back plate at an angle that helps rather than hinders fan action . . . and that greatly reduces back plate erosion. *Result*—higher overall efficiency, lower maintenance costs, less time out-of-service for repairs.

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PIPE LINES

WEP Deliveries Increased To East Coast Refineries

From the 105,000 bbl. daily pumped through the War Emergency Pipelines, Inc.'s Texas-East Coast 24-in. crude-oil line at the beginning of this week, throughput is being stepped up to 170,000 bbl. daily at the end of the week by putting in operation additional stations. According to the new schedule, oil is pumped by two units at each of the following stations on the eastern extension: Norris City, Ill.; Oakland City, Ind.; Lebanon, Ohio; Summerfield, Ohio; Uniontown, Pa.; Rockwood, Pa., and Phoenixville, Pa. Two leaks which occurred last week were repaired promptly and pumping was resumed soon afterward.

On August 13 the line from Longview, Tex., to Norris City, Ill., broke all records with a throughput in a 24-hour period of 327,970 bbl. or practically 328,000 bbl. which demonstrates what can be attained in operating under favorable summer conditions.

When the full complement of stations is in operation on the 24-in. line about September 15, it is expected that deliveries will be made at the rate of 300,000 bbl. Eastward tank-car movements of crude oil from the Norris City terminal will then be discontinued. Approximately 8,500 cars will be released for a short period which will elapse until the Norris City-Beaumont leg of the 20-in. products line is completed and put in operation.

A total of 950 miles of pipe was laid at the first of the week for the WEP Gulf Coast-East Coast products line, of which 840 miles was 20-in. pipe and 110 miles was pipe of 16-in. and smaller diameters for the feeder lines. On August 20 a total of 19.6 miles of line was laid.

Stanolind Ready for Survey Crews on 16-In. Line Route

Stanolind Pipe Line Co. is preparing to put two survey crews in the field to stake the right-of-way for the proposed 16-in. crude-oil line from West Texas to Drumright, Okla., which will have a capacity of 65,000 bbl. daily with pump stations in operation at Slaughter, Tex., and Bretch, Okla. More than half of the right-of-way has been optioned.

The company is considering laying a 17-mile 4-in. crude-oil line from the Clodine field, Fort Bend County, Texas, to its Dopslauf station at Fairbanks, Tex. Investigation is being made regarding right-of-way problems which are complicated by proposed plans for a flood control dam in the vicinity. Oil is now being trucked by the Stanolind company from the Clodine area.

Postwar Tanker Increase Predicted by Shipbuilders

The war will end with the United States owning more and better tankers, many of them with a capacity of 6,300,000 gal. each, according to "Ships," publication of Shipbuilders Council of America. At the time of Pearl Harbor the 450 oil tankers under the American flag are said to have represented a fifth of the entire merchant marine tonnage of this country.

Albany-Boston Pipe Line Project Is Disapproved

Proposed construction of trans-New England pipe line from Albany, N. Y., to Boston, Mass., has been disapproved for the reason that it would not materially increase shipments of petroleum products to the Northeast, acting Petroleum Administrator Ralph K. Davies announced last week.

The proposed line would have been a 114-mile 10-in. pipe line from Albany (Rensselaer), N. Y., to West Boylston, Mass., and a 51-mile 8-in. pipe-line extension to Breed's Island in the Boston area, with capacities of about 50,000 bbl. daily and 30,000 bbl. daily, respectively. The estimated cost of the line would have been $5,350,000. It would have required some 17,000 tons of new steel.

Principal objections to building the trans-New England line, as set forth in the report are:

Existing transportation facilities are now sufficient to provide the entire East Coast with its full, equitable share of the petroleum supplies that can be made available in the states east of the Rocky Mountains.

Petroleum supplies are being increased and will continue to increase during this year. However, transportation facilities already under construction, particularly the 20-in. pipe line from Texas to New York, will be

adequate to move all of the increased production which can reasonably be anticipated. In view of this, any further new transportation facilities for movement of petroleum to the East Coast would not increase supplies but would merely render idle some of the existing facilities.

Hugoton-Blackwell Project Examined by FPC

Hugoton gas reserves are needed to avert a breakdown in war production this winter in the Missouri, Oklahoma and Kansas area, Harry D. Hancock, chief engineer of the Cities Service Gas Co., testified before Edward B. Marsh, Federal Power Commission examiner, at the hearing on the company's application for a permit to build a line to the field. Mr. Hancock said the company felt the emergency so vital that work on the project already was under way.

Construction contracts were awarded July 28 for the 26-in. pipe line and 193 miles of the 231-mile right-of-way from Guymon to Blackwell, Okla., have been purchased.

That the company proceeded to prepare for construction before obtaining a permit from the FPC is one of the issues in the hearing. When the company was cited to show cause why it hadn't obtained a certificate of convenience and necessity it promptly filed an application.

The hearing is an unusual one in that the company must show why it did not ask for an application and at the same time show why it did. The company's defense is that its actions were justified by the war emergency and had been approved by two other government agencies, the War Production Board and the Petroleum Administration for War.

Mr. Hancock said an investment of about $738,000 by the pipe-line company would be necessary to handle the additional flow of gas to swell the supply for the eastern section of the system. The money would be used for looping pipe to put the increased flow into lines not already loaded.

The line is estimated to cost about $15,000,000. It originally was expected to be completed January 31, but the start of work now is scheduled about 3 weeks later than originally planned.

Construction Started on Kamsack, Canada, Line

KAMSACK, Sask.—Pipe is being unloaded and strung for the transmission and distributing system of the Kamsack Gas & Oil Co., intended to supply this town from the adjacent shallow gas field. Construction of the transmission line and distributing system will probably be completed this fall.

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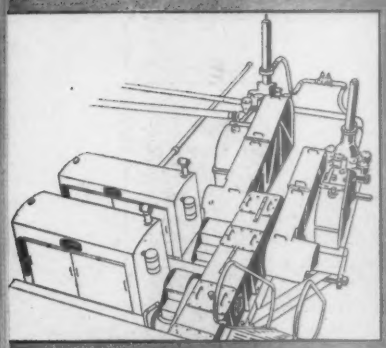

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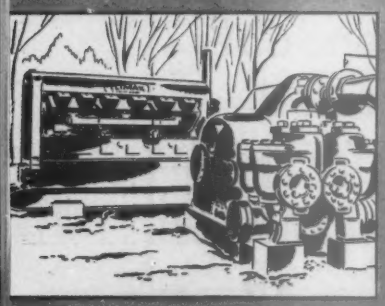

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Exploration and Drilling

Week's Highlights

THE reported finding of oil in the Burgess in Dickinson County, Kansas, opens up a number of interesting possibilities. The test is on a long narrow trend extending from the Burrton field in Reno County, through Voshell and Roxbury in McPherson County and the recently discovered Hunter pool in southeastern Saline County. On a parallel trend to the west lies Lindsborg, one of the most active districts in recent months and the Salina discovery. To the east are other parallel trends in Marion County. Still farther east is the dominant Nemaha ridge.

These parallel north-northeast to south-southwest belts of folding have thus been traced from the Central Kansas uplift into the Salina basin and serve as a guide to future prospecting in the area.

The second interesting fact is that the oil was found in a Pennsylvanian sand. That it is actually the Burgess of southeastern Kansas and northeastern Oklahoma is unlikely. The multiple sands of that region are correlated with some difficulty and there is no reported Burgess production within 100 miles of the new find. However, the name is of little importance beside the fact that this is the first reported Pennsylvanian sand production from the Salina basin or its margins. Elsewhere the Viola, Hunton and Mississippi lime are the principal pays with the Arbuckle and Kansas City-Lansing coming in on the ridge.

The Dickinson County find cannot yet be classed as a discovery as the well has not been completed, but the presence of oil in the hole indicates that same conditions may prevail in the Pennsylvanian in this basin as in the eastern Kansas basin and that lensing sands on structural trends may be sought with some hope of commercial production.

Announcement of what is probably the year's wildest wildcat by Standard Oil Co. of New Jersey has caused considerable comment. The company has announced that it is not starting the venture with any great degree of optimism but that its 5,000-ft. hole in such an area is indicative of the nation's present need for new oil (p. 128). More geologists have been chagrined by the finding of major oil fields where they could not exist than by any other single cause and they have learned to be cautious with their negative statements. However, in the case of the Morristown well, it seems to start in the Triassic red beds and the only other formation known to occur below is mapped as Archean, although it may be anything from Ordovician down. At any rate, it is highly metamorphosed and rocks of this type have not been considered possible sources for oil.

On the other hand oil geologists have learned that rocks below the surface do not always resemble those on outcrop. New facies come into the section and sand lenses which do not outcrop may appear. In the section near Morristown, dark shaly rocks are reported and there have been reported oil seeps in the area. It may be that a considerable marine section will be found. Thus, if the block is finally assembled and the well is drilled, not only a new state but a new producing horizon may be added to the list of oil producers in the United States.

OKLAHOMA: The newly discovered Medrano sand has brought the Cement field back into the list of most active fields (p. 117).

ALBERTA: New gas fields have been opened in the Peace and Athabaska River districts (p. 121).

CALIFORNIA: A new producing area has been found in the Republic district of the Midway-Sunset field (p. 112).

COMPLETIONS IN ALL FIELDS . . .

(Week ended August 21, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna., W. Va.	49	13	4	66	124,860	2,137	2,213
Ohio	8	4	11	23	54,189	547	684
Indiana	2	0	1	3	6,005	140	207
Kentucky	4	0	2	6	11,875	239	134
Illinois	14	0	13	27	59,500	1,094	1,058
Michigan	5	3	6	14	33,390	354	445
Kansas	22	0	11	33	109,387	1,017	972
Nebraska	0	0	0	0	0	20	24
Missouri-Iowa	0	0	1	1	498	10	10
Oklahoma	8	1	16	25	71,707	723	785
Texas:							
North Central Texas	22	0	28	50	132,563	883	722
West Texas	23	0	5	28	134,959	538	961
Texas Panhandle	3	0	0	3	9,314	116	247
Eastern Texas	2	0	2	4	27,666	178	259
Texas Gulf Coast	7	1	2	10	75,235	279	487
Southwest Texas	7	2	6	15	75,348	569	737
Total Texas	64	3	43	110	455,085	2,580	3,413
North Louisiana	0	4	1	5	16,523	199	298
Louisiana Gulf Coast	3	0	3	6	54,881	233	329
Total Louisiana	3	4	4	11	71,407	432	627
Arkansas	4	0	2	6	40,110	154	105
Mississippi and Southeast	0	0	2	2	14,055	57	33
Montana	6	0	3	9	17,988	136	123
Wyoming	5	1	1	7	27,276	81	65
Colorado, Utah	0	0	0	0	0	18	11
New Mexico	0	0	3	3	13,953	131	155
California	33	1	7	41	115,728	825	478
Total United States	227	30	130	387	1,228,995	10,675	11,542
Total previous week	211	39	142	392			
Week ending Aug 22, 1942	171	47	113	331			

ROCKY MOUNTAIN

Embar Pay Extended to South At Oregon Basin

DENVER, Colo.—An important extension of the Embar pay at the south end of the south high of the Oregon Basin field, Wyoming, was chalked up this week in the Dry Creek Oil Co. 2 Government, NE NE SW 9-50n-100w, which made 225 bbl. per day through perforations in the 7-in. at 4,199-4,240 ft. The hole was carried into the Tensleep and then plugged back, but results in the deeper horizon were not revealed as the practice at present is to produce from the Embar. The well is located 1¼ miles south of the nearest producer and 10 miles south of the most northerly well in the field. It is on the 1,300-ft. contour, which puts it about 1,000 ft. down from the top of the south dome. it proves up approximately 640 acres between the well and the nearest producers to the north, of the intervening acreage being controlled by the Ohio Oil Co. The well is an east offset to a test drilled in 1934 by the same interests which were looking for light oil on the flanks. This well was drilled to 1,157 ft. and gaged 11,000,000 cut. ft. of gas from the second Wall Creek sand in the Frontier formation. This test proved the south closure of the structure, and at the time the late C. T. Lupton, who geologized the field, predicted deeper drilling would result in finding an oil pay, but on account of the then limited market for black oil, no further testing was attempted.

Stanolind high bidder for Winkleman.—The Stanolind Oil & Gas Co., which last week established an all-time high on bids for oil and gas leases in the Rocky Mountain area when it offered an aggregate of $1,245,500 bonuses for leases on 217½ acres in the Elk Basin field, was high bidder for Tribal leases on the Winkleman dome in Fremont County, Wyoming. Sealed bids were opened at the Indian agency at Fort Washakie on August 11 on 960 acres in Sections 18 and 19-2n-1w and 13 and 24-2n-2w. Carter Oil Co. submitted an offer of $3 an acre and the British-American Oil Producing Co. bid $5 an acre. Stanolind topped these with a bid of $25.60 an acre. The leases provide for a royalty of 12½ per cent. The structure is a faulted anticline with 300 ft. of closure, located south of the Pilot Butte and Steamboat Butte fields where discoveries recently were made in the Sundance and Tensleep horizons. The Sage Creek Petroleum Co. drilled two wells in 18-2n-1w in 1917, and completed them for 3,000,000 cu. ft. of gas in the Morrison sand at 945 ft. The Sundance, Embar and Tensleep have not been tested. The general supposition is that Stanolind is seeking reserves to be moved ultimately through its pipe line from Salt Creek to Freeman, Mo., and is connected with rumors that the company contemplates the construction of a connection between the Big Horn basin field and the eastern trunk line.

Tensleep test at Little Grass Creek. Little Grass Creek, another Big Horn basin structure which has been producing for years from upper horizons, is to have a deep test to the Tensleep in Fred Goodstein, and others, 3 Mountain States Power, C SW SW 11-46n-99w. The structure, which has an independent closure in the upper horizons of 500 ft., is separated from the Grass Creek field by a narrow syncline. Two gas wells have been drilled in the field, the first in 1917, near the new location, which had an initial production of 30,000,000 cu. ft. from the second sand in the Frontier at 2,562 ft., and the second in 1919 for 10,000,000 cu. ft. The Dakotas, Sundance, Embar and Tensleep have never been tested. Rigging up of rotary is in progress.

Madison test at Maverick.—Continental Oil Co. completed its 19 Chatterton, NW SW NE 9-6n-2w, Maverick Springs field, Fremont County, Wyoming, in the Tensleep for 10 bbl. an hour on a swabbing test. It is an outpost well on a narrow neck extending out to the northwest and 2½ miles from the top of the structure. This was followed by the release of a location for a test to the Madison lime at an inside location in 20 Chatterton, SE NW SE 15-6n-2w.

East Side producer at Elk Basin.—The first Tensleep well east of the discovery at Elk Basin was completed in Minnelusa Oil Corp. 1 E-T "F" Henderson, NE NW NW 32-58-99, which flowed 65 bbl. an hour through the tubing at 5,272 ft., total depth, from the Tensleep, topped at 5,090 ft. It is located 1,320 ft. east of the discovery, and found the pay 192 ft. lower. Tensleep completions heretofore have been on the north, south and west sides.

Deep pay at Cole Creek.—General Petroleum Corp. 48 State, SE SE SW 16-35n-77w, Cole Creek, made 160 bbl. per day of 37-gravity oil through a ⅛-in. choke on the tubing from the Dakota-Lakota sands at 8,008 ft., total depth. Location is a little more than ½ mile north of the discovery, which was completed in 1937 in the Lakota for 500 bbl. initial at 8,015 ft. Subsequently another deep test was drilled and abandoned. The operator then began developing the Shannon sand at 4,500 ft., and drilled 20 wells to that horizon which disclosed the subsurface structure. The new test was spotted on the basis of the information thus gained. The casing was perforated at 7,928-46 ft. The 5½-in. was set at 7,984 ft., 3 ft. above the top of the Lakota, and production is coming from both sands. The discovery was plugged back to the Shannon several years ago.

Gas at East Kevin.—Northern Ordnance, Inc., which is carrying out an extensive wildcat campaign on Carter Oil Co. blocks in Montana, is testing in its 1-C State, NE NE 36-35n-1e, East Kevin district, Montana. It set

(Continued on Page 122)

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 21 crude oils	Aug. PAW quota all oils*	Aug. 14 crude oil
Arkansas	76,225	75,500	76,235
California	780,450	830,000	788,250
Colorado	7,400	7,000	6,530
Eastern fields	101,500	111,500	97,950
Illinois	211,350	222,800	227,400
Indiana	13,000	14,000	14,750
Kansas	308,100	300,000	306,200
Louisiana	351,830	356,300	352,280
North Louisiana	*83,330*	.....	*83,730*
Louisiana Gulf Coast	*268,500*	.....	*268,500*
Michigan	53,100	60,100	60,200
Mississippi	50,165	50,000	54,365
Montana	21,215	23,300	19,485
Nebraska	1,950	2,100	2,000
New Mexico	104,500	110,000	105,000
Oklahoma	329,250	347,000	331,450
Texas	1,711,250	1,817,000	1,710,600
East Texas	*371,000*	.....	*371,000*
West Texas	*253,400*	.....	*253,400*
North Central Texas	*140,400*	.....	*140,400*
East Central Texas	*129,950*	.....	*129,950*
Texas Panhandle	*93,000*	.....	*93,000*
Texas Gulf Coast	*624,900*	.....	*624,250*
Southwest Texas	*83,600*	.....	*83,600*
Wyoming	103,000	98,000	105,890
Total United States	4,224,285	4,424,600	4,258,585

Total production Jan. 1-Aug. 21, 1943 ..... 925,260,965 bbl.
Same period last year ..... 880,564,718 bbl.
*Includes 245,000 bbl. daily average of natural gasoline and associated products.

SOUTHWEST TEXAS

Many Wildcat Operations Under Way in Bee County

CORPUS CHRISTI, Tex.—Wildcatting activity was rising in several Southwest Texas areas this week. In Bee County, where there were only 10 wildcat completions in all of 1942, there already have been 11 completions thus far this year and there are 9 wildcat locations or operations in various stages of progress at this time. Two of these, not previously reported, are W. E. Rowe's 1 Ben Mattingly estate, 4 miles northwest of Skidmore, a location, and H. E. Dirks' 1 George W. Strake, 4 miles northwest of Mineral, a derrick. Two new wildcat locations have been staked in Jim Wells County. Humble Oil & Refining Co. has spotted 1 R. R. Mullen, 2 miles northwest of Magnolia City. Stanolind Oil & Gas Co. will drill 2 H. C. de Tijerina 5 miles southwest of Ben Bolt. In Nueces County, which had been rather quiet, Chicago Corp. was moving in last week for 1 Weil Brothers, a projected 10,000-ft. test 4 miles southwest of Corpus Christi. and Sinclair Prairie Oil Co. has staked location for 1 J. H. Shary, 3½ miles southwest of Robstown.

Possibility that one of the Bee County wildcats, Transwestern Oil Co. and H. B. Zachery 1 Holzmark estate, 4 miles southeast of Mineral, will be a pool opener is indicated by a blowout which occurred while the crew was coring in a soft formation The test is reported to have blown 4,000,000 cu ft. of gas from 8,301-09 ft. It was said completion of the well would be delayed by a stuck drill stem.

Four wildcat locations have been staked in Webb County. Dulup Oil Co. has spotted 1 J. C. Garcia, a mile east of the Aviator field. Frank Gravis will drill 1 E. T. Laubscher, in the J. Galan grant. H. H. Weinert and A. B. Bauchman have staked 1 Pedro Leal, 6 miles north of Bruni. Holland Oil Co. is moving in at 1 Laubscher, in the Galan grant. Phillips Petroleum Co. and Texas Gulf Production Co. have spudded 1 A. M. Bruni, 20 miles southeast of Laredo.

Zapata County.—Texas Co., at plugged-back depth of 2,308 ft., was swabbing wash water, with a trace of oil, at 2 B. Hartman, 5 miles west of Guerra. At 3 Hartman, same area, total depth 2,329 ft., Texas made a 65-minute drill-stem test from perforations at 2,318-29 ft., with ½-in. choke at bottom and ⅝-in. chope at top. It tested no pressure and recovered 10 ft. of oily mud and 210 ft. of salt water. At latest report the crew was waiting on orders.

Starr County.—Continental Oil Co. set 7-in. casing at 5,004 ft. at 1 William Cameron, 2 miles northeast of the Rincon field, and was waiting for cement to harden. T. E. Stephens had drilled to 1,756 ft. at 1 A. Ramos and was expected to deepen to 2,250 ft. Sun Oil Co. was drilling at 7,483 ft. at 1 P. L. Salinas (second hole), 2 miles southeast of the Sun field.

Live Oak County.—Smith & Storey, Inc., has spudded 1 Booth, Hampton & Booth, a mile east of Mount Lucas

J. H. Durbin et al have spudded 1 P. Maurin, 3 miles southwest of Whitsett.

SOUTH TEXAS WILDCAT COMPLETIONS

Live Oak County: Henderson Coquat 1 W. W. Goebel, 2½ mi. NE of Oakville. dual completion; from perf. 6,972-82 ft. 113 bbl. distillate and 10,000,000 cu. ft gas open flow, S.I. pressure 2,100 lb. gas-oil ratio 88,546, from perf. 7,082-84 ft., 96 bbl. oil with 41 per cent salt water through ¼-in. choke, T.P. 1,825 lb., gas-oil ratio 18,273, T.D. 7,090 ft Discovery field named Goebel.

Dirks Bros. and H. Coquat Co. 1 Lacks & Knight, 5 mi. E of Goebel field, dry at 8,206 ft.

McMullen County: Quintana 6-C South Texas Syndicate, 13 mi. S of Fowlerton, dry at 7,200 ft., completed as fresh water well.

Zapata County: Government Wells Co. 1 Y. Martinez, 4 mi. NE of Cuellar field dry at 2,338 ft.

V. G. Schmimmel 1 fee, 15 mi. SE of Zapata, dry at 3,017 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Gonzales County: H. H. Coffield et al 2 J. H. Harris, 7 mi. S of Waelder, dry at 2,140 ft.

TEXAS GULF COAST

Wharton County Wildcat Finds Oil Showing in Upper Frio

HOUSTON, Tex.—Reports from the wildcat, 1 Claude Appling, which is being drilled by W. Stewart Boyle and John Mayo a mile west of Louise, in Wharton County, point to the likelihood of its being a pool opener. On a 6-minute drill-stem test, with perforations at 4,085-4,118 ft., the crew is said to have recovered 200 ft. of oil. Working pressure was 700 lb. and flowing pressure 1,700 lb. At latest report the Appling was drilling in shale at 5,550 ft. It was planned to carry the hole to 6,150 ft. and to test all sands in the Frio formation. John B. Coffee's Wharton County wildcat, 1 C. T. Kountze, south of the Louise field, was drilling at 4,900 ft. in shale.

Increase in wildcat operations, with attendant interest on the part of lease and royalty traders, is noted at various points along the Gulf Coast. In Brazoria County, almost devoid of wildcat activity for months, four projects are either staked or started. E. Cockrell Co. was rigging up last week at 1 Seaburn estate, in the Stratton Ridge area. Glenn H. McCarthy, Inc., was moving in at 1-A W. B. Munson, in the Bailey's Prairie area. In Fayette County, where a gas well brought in by Continental Oil Co. in June 1942, is the only producer of any sort that has rewarded wildcatters, Continental is trying again. It was moving in last week at 1 Tom E. Cockrell, in the J. T. Whiteside Survey, and it has staked location for 1 A. E. Adamcik, 6 miles north of Cistern.

Jefferson County. — Texas Co. 1 Barnes, a mile southeast of Fannett, drilling in hard shale at 6,755 ft., ran en electrical survey from 6,717 to 1,130 ft. After prolonged delay, caused largely by difficulty in getting drilling crews, Sun Oil Co. has started drilling 1 Quinn, 5 miles northwest of Beaumont. Glenn H. McCarthy, Inc., et al were drilling at 6,855 ft. in shale and sand at 1 McFaddin Trust, 4 miles south of Hampshire.

Montgomery County. — Following delay resulting from collapsed casing. Humble Oil & Refining Co. has resumed drilling 1-B Texas Long Leaf Lumber Co., 1½ miles northwest of Splendora. As the week closed it was below 9,200 ft. in sandy shale.

Fort Bend County.—Northern Ordnance Co. 1 W. J. Morrow, in the J. McKnight Survey, was drilling at 5,867 ft. in shale and sand. Phillips Petroleum Co. has derrick up for 3 E. M. Robinson, in the Blue Ridge field area.

Matagorda County.—Ohio Oil Co. was reaming 1-A J. E. Pierce estate, 1½ miles northeast of Blessing. The well was at 8,160 ft. in shale. Sun has staked location for 1 Sternadel, a Frio sand test 3½ miles northwest of Blessing.

Jackson County. — Humble was

(Continued on Page 128)

CALIFORNIA

Well in Republic Area of Midway-Sunset May Extend Pool

LOS ANGELES, Calif. — Republic Petroleum Co. is drilling what might prove to be the forerunner of an aggressive development program in the southwest end of the Midway-Sunset field although the possible productive area is expected to be relatively small. Republic's well in this area is No. 7-44 in 7-32s-23e, and appears to be running substantially higher than a discovery made to the north in 6-32s-23e, by Chanslor-Canfield Midway Oil Co. a few weeks ago. The result of drilling operations to date indicate that Chanslor-Canfield Midway's discovery well in Section 6 is located on the north dip of the Republic pool to the southeast. Republic is at present swabbing and should be on production within the next 48 hours. The present well is the most northerly drilled to date by Republic Petroleum in Section 7 and it has looked very good during the course of drilling. There is a possibility there may be a crossfault between the discovery of Chanslor-Canfield Midway Oil Co. in Section 6 and Republic's well.

The Republic pool which was discovered over 10 years ago has proved quite prolific and has produced over 11,000,000 bbl. of oil. Midway-Sunset wells as a rule show long life and for this reason the Republic pool still has a long pumping period ahead of it in which to greatly increase cumulative production. Chanslor-Canfield Midway Oil Co. owns all of Section 6 and 480 acres out of 640 acres in Section 7 so this operator should show a substantial appreciation from the discovery in Section 6 and outpost drilling of Republic Petroleum in Section 7. The total number of wells that might possibly be drilled in this area will be comparatively small but they may be drilled in a short time if future developments justify. Extension work out in the extreme west end of the Midway-Sunset field during the past several months has not proved especially successful although several wells have been completed as small pumpers from around 800 ft. in depth. The accumulation in this area is found in comparatively thin oil sand streaks and oil sand within the brown shale member

Fresno County.—Two new wildcats started up in Fresno County this week and both should get under way shortly. The first of these wildcats to be started will be 1 Bordieau of Standard Oil Co. in the Polvadero district in 1-21s-16e, and the second wildcat scheduled to be started within the next 2 weeks is 1 Wells-Fargo in the Jacalitos area in 30-21s-15e. Amerada is preparing to start a new well in the Lanare-Wheatville district where Superior Oil Co. completed a wildcat a month or so ago from a very thin oil sand streak in the Miocene. Amerada's test will be drilled in 15-17s-18e, and the well will be drilled in about the center of the section. At Raisin City where Seaboard, Union and Tide Water found a new field a week or so ago, Universal Consolidated Oil Co. has location staked for a well to be drilled on the Taylor lease in 14-15s-17e, and spud will be made within the next 2 or 3 weeks. Seaboard, Union and Tide Water have made location for their second well which will be designated as 31-14 S.T.U. The discovery well is still holding up in good shape, current production being 546 bbl of clean 24.6-gravity oil through a 15/64-in. bean behind a tubing pressure of 900 lb. and casing pressure of 1,300 lb. In the Pleasant Valley field, R. S. Lytle has been delayed with his No. 86-20-F but should have the well on production in the near future.

Kern County.—Continental Oil Co. is making hole in 1-G Kern County Land in the McClung district southeast of the Greeley field and is headed down in search of the Rio Bravo and Vedder zones of Miocene age. The Stevens zone also of Miocene age was set at 7,462-7,540 ft. and drilling operations were resumed. The Stevens did show considerable gas and some crude oil so that an additional test may be started later on if the present well fails to find the Rio Bravo and Vedder zones productive. Paul Getty failed to find the Portales zone at Edison productive in his second well and has abandoned work at 4,263 ft. The zone which proved quite productive in his initial well was too tight to produce in the second test.

Western Gulf should have 36-1 Los Angeles Athletic Club in the Paloma field on production within the next day or two at the most as all that remains to be done is to perforate opposite the zone to be produced. Standard has started two new wells in the Elk Hills field and one will be finished in the Stevens zone of Miocene age and the other will be carried down in search of the Rio Bravo and Vedder sands. The latter will be drilled to a depth below 12,000 ft. unless the sand is found sooner or geological conditions preclude the existence of commercial production below the Stevens. Drilling operations continue at a high rate in most San Joaquin Valley fields but it is becoming apparent that some relief must be effected that will make available additional drilling crews. The critical shortage at present seems to be in drillers, and other classifications that have low training times.

Los Angeles Basin

Los Angeles County.—Standard Oil Co. has decided to make a thorough test of the Miocene in the Inglewood field because after coring through the Sentous zone in 1-36 Vickers the company resumed drilling. It has been tentatively decided to carry the bit down into the basement if this is possible and feasible. This well is located in the central part of that segment of Inglewood field located west of the main fault and south of original production developed in the Sentous zone down on the northwest dip of the Inglewood structure. In the segment east of the Inglewood fault, which splits the field into two parts, Standard is not yet deep enough to pick up the pay if it is present but should reach the critical depth within the next several days. Standard's drilling program is, therefore, to determine if commercial production can be expected in the central part of the field on both sides of the fault. The Sentous has been found on the west side and conditions east of the fault should be known within a short time. Some definite action will probably be taken soon in awarding a contract to permit directional drilling beneath the Hyperion outfall sewer as the city of El Segundo has made it possible to locate the surface location within that area.

Orange County.—The Jones sand in the Huntington Beach tideland accumulation continues to yield good flowing well and completion of several additional wells may be expected during the course of the next several weeks. Interest was focused on this zone a few weeks ago when H. R. Hamilton, operating as the Huntington State Co., finished an excellent flowing well. This week Southwest Exploration Co. added another good Jones sand to its list although initials do not reflect the real potentiality of new completions. This company's 11-J was good for 850 bbl. per day but was beaned back immediately subsequent to completion and the first full day's production only totaled 275 bbl. Large production is being secured from the Jones sand because operators are flattening out the bottom of the directionally drilled hole and in this way are able to take in over 1,250 ft. of formation. To date five tideland wells have been completed in the Jones sand and every

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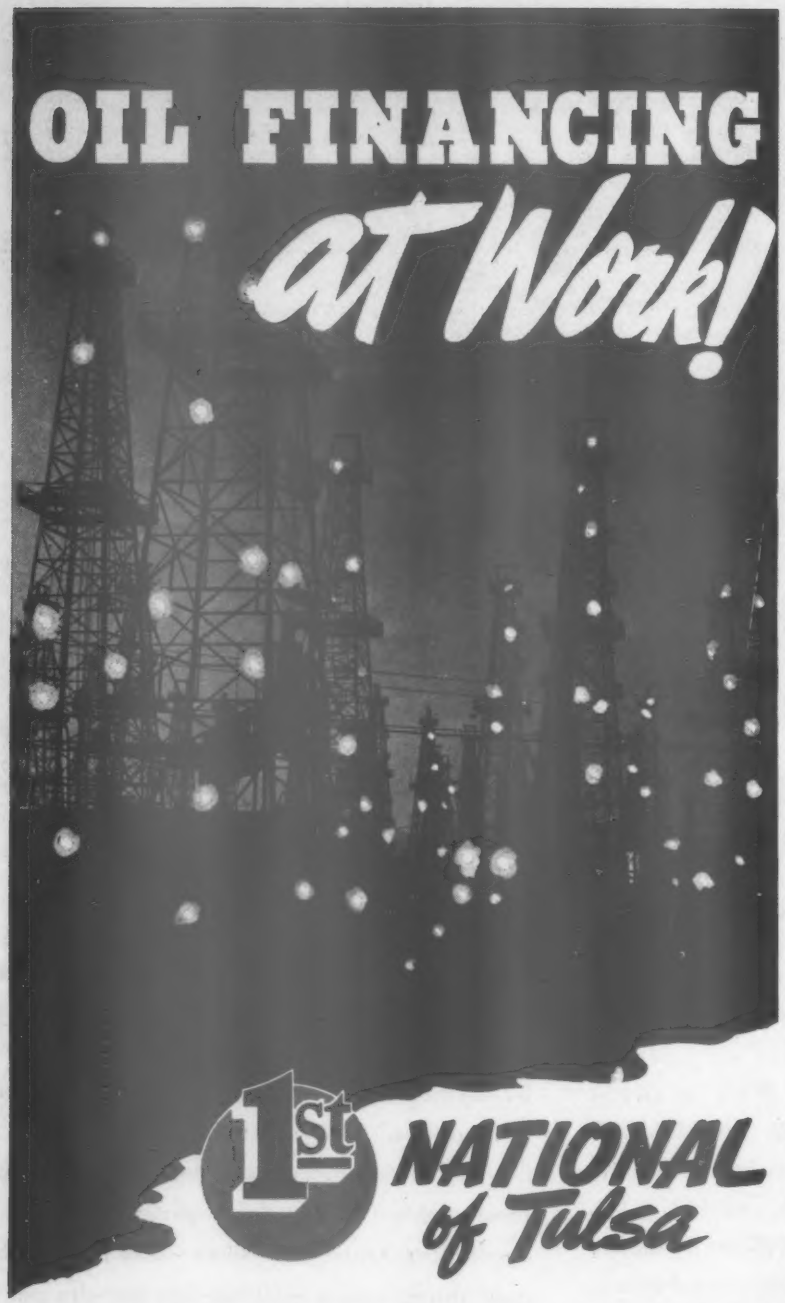

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one proved to be a large producer although actual production is being kept down to a minimum. Directors of the state land office will meet within the next few days to make a decision as to whether bids should be asked to permit tideland development in the Newport Beach district where Walter Elliott completed a good pumping well about 1,000 ft. back of the beach area and it is quite likely that the decision will be to ask for bids. If Elliott's well was not producing there would be no incentive to ask for bids as the accumulation would not be subject to drainage but now that this well is on production the state Land Commission is justified in asking for bids to develop the tideland. This work will have to be done from surface locations back of the beach on the uplands and the accumulation reached by directional drilling. Some aditional drilling is getting under way in the East Coyote field reflecting several recent completions and five locations have been staked for future use by Hathaway Co., Severns Drilling Co., Bartholomae Oil Corp. and Union Oil Co.

Coastal District

Ventura County.—Continental Oil Co. has plugged 2 Holser on the Ramona anticline from 8,147 ft. to 6,250 ft. and perforated casing at 4,970-35 ft. and 4,865-35 ft. This interval proved wet and the company is now testing the interval at 4,755-85 ft. This well has not shown a thing since being spudded in and will probably be on early abandonment. Standard is drilling and coring at the other end of the anticline and to date has not shown much encouragement. Up in the Temescal area, Pacific Western is quietly drilling a deep test in 4-4n-18w, and has reached a depth of 9,151 ft. without finding much in the way of deep production. In the Rincon area, Shell Oil Co., Inc., has drilled a total of about 15,000 ft. of hole in 1 Tomson due to a redrill job and has abandoned work. Union Oil Co.'s wildcat in the Torrey Canyon district is spot coring at 5,600 ft. but has not found any encouragement to date This well is not deep enough, however, to furnish a conclusive test

Newhall-Castaic area.—Two wells are being prepared for production in the Aliso Canyon field and both Standard's 1-2 Sesnon and Associated's 47 Porter should be tanking oil within the next few days. In the Del Valle field, R. E. Havenstrite is preparing to redrill 1 Liebhart in the eastern end of the field and has derrick standing for 3 Barnes. Jack Herley and Paul Kelley's 1 Orduno has been showing up fairly well during the last 50 ft. of hole and plans are under way to make a formation test of some oil sand. This well will extend the productive limits of the field if it results in commercial production. General Petroleum Corp. and

Standard Oil Co. have started tests to determine the possibility of extending the productive limits of the Aliso Canyon field. Last year Standard succeeded in extending the western limits almost a mile by completing 1 Sesnon in what is now known

(Continued on Page 124)

MICHIGAN

Oil Showing Found in Kalkaska County Wildcat

SAGINAW, Mich. — With Michigan crude-oil production holding steady, exploration added little to the prospects for increase in the past week as five of the six dry holes reported were classed as wildcat tests. Five other tests were completed for oil production, the best of the lot being Pure Oil Co. 1 Detroit Trust Co. in Section 8, of Goodwell Township (14n-11w), Newaygo County. Initially the well flowed 428 bbl. in 16 hours.

Michahome Oil Co. developed a well which pumped 200 bbl. a day after acid in Section 20 of Bangor Township (2s-16w), Van Buren County; a 650-bbl. well was brought in in Fillmore, Allegan; a 75-bbl. well in Bangor and a 110-bbl. producer in Columbia, Van Buren.

Completing the record of 14 completions for the week were three natural-gas wells, two by Taggart Brothers Co. in the Cranberry Lake field of Clare County, the other in Norwich, Newaygo.

Only the 1 Lawrence in Clearwater Township, Kalkaska County, gave promise among the five wildcat tests, but it, too, was completed as a dry hole when acidizing for a show of oil failed to bring results.

Michigan Oil and Gas Association announced July production from 3,338 wells in the state averaged 56,124 bbl. a day, for a total of 1,739,844 bbl. The June average was 56,118 bbl.

The state Conservation Department reported it issued 15 more drilling permits in the past week. Bringing the 1943 total to 355, the permits are for 5 tests in Mecosta County, 2 each in Van Buren and Osceola, 1 each in Newaygo, Gladwin, Ottawa, Allegan, Bay and Arenac counties.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Heath Township: Stanley J. Findley 1 John H. Minegar, SW SE SE 24-3n-14w, dry at 1,523 ft.

Gladwin County, Beaverton Township: Sun Oil Co. 1 Earl Robinson, E½ SW SW 20-17n-2w, dry at 4,065 ft.

Kalkaska County, Clearwater Township: Ohio Oil Co. 1 Roy E. Lawrence, E½ NE NE 12-28n-8w, dry at 2,215 ft. after acidizing for oil shaw at 2,178 ft.

Van Buren County, Columbia Township: Homrich & Kendall 1 Carroll, SE SE SE 20-1s-15w, dry at 1,143 ft.

Pine Grove Township: Robert Zones and C. C. Goff 1 Otis Kasler, SW NW 14-1s-13w, dry at 1,456 ft.

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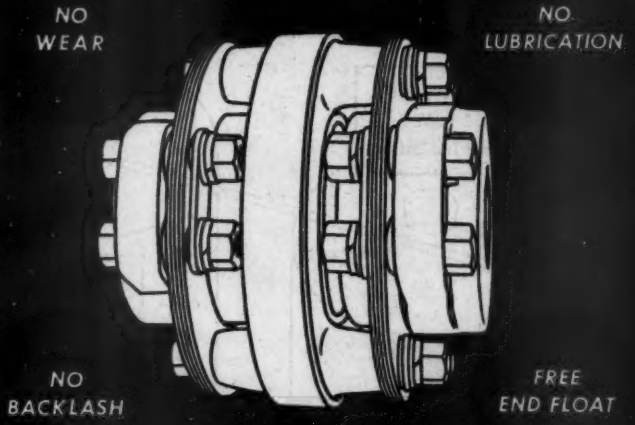

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LOUISIANA GULF

Reddell Prospect Test Opens New Deep Wilcox Pool

NEW ORLEANS, La.—Doubt as to whether Danciger Oil & Refining Co. has a pool opener in its Reddell area wildcat, 1 Hattie Haas, in Evangeline Parish, seems to have been dispelled by a 15½-hour test in which the well flowed at the rate of 72 bbl. of 51-gravity distillate daily through ⅝-in. choke at the top and ¼-in. choke at the bottom, with perforations at 12,116-22 ft. Gas-oil ratio was 14,300. Total depth is 12,206 ft., plugged back to 12,154 ft. Further tests are to be conducted, and the next test will be at 12,041-66 ft., which showed gas. The Reddell area has held the watchful interest of major operators for years, and geophysical work indicated the presence of petroleum. Humble Oil & Refining Co., Continental Oil Co., Tide Water Associated Oil Co., and Amerada Petroleum Corp. hold acreage in the vicinity of the well. Interests represented by Col. David Haas, of Bunkie, have the largest holdings, controlling about 1,900 acres. Several deep dry holes have been drilled in the Reddell district.

In a 15-hour test at Amerada Petroleum Corp. 1 Clarence D. Daigle, 1¼ miles northeast of Church Point, Acadia Parish, this wildcat flowed 70 bbl. of distillate, 4 hours on ⅛-in. choke and 11 hours on 5/32-in. choke. Maximum tubing pressure was 3,700 lb. Gas volume was 1,573,000 cu. ft. Testing continues. A new Acadia Parish wildcat location staked is Union Sulphur Co. 1 Edward E. Daigle, in 49-7s-2e, near Amerada's test. There are now four active wildcat operations in Acadia.

Beauregard Parish.—Sohio Producing Co. 1 Lutcher-Moore Lumber Co., 1¾ miles west of Fields, may plug back and test a possible oil show at 7,932-82 ft. At 10,911 ft. the well began kicking, but it is now believed this was caused by the strong salt-water flow. Two disappointments have been recorded in the new Bear field. Southwest of the discovery Humble 1 Krause-Managan Lumber Co. was abandoned at 6,900 ft. Northeast of it Phillips Petroleum Co. 3 First National Bank of Beaumont was dry at 6,560 ft.

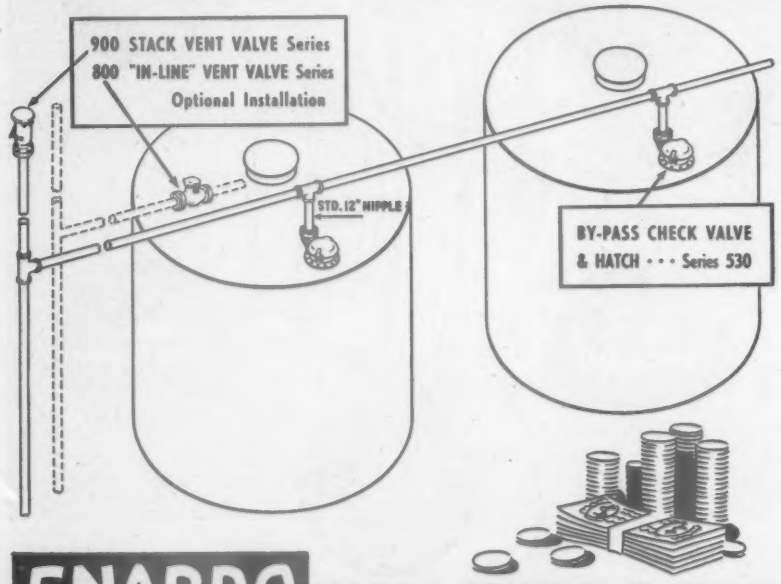
Calcasieu Parish.—Union Sulphur Co. 1 Starks & Brown, second test in the Gum Cove area, was drilling at 9,081 ft. in sand with streaks of hard shale.

Cameron Parish. — Continental 1 Adolph Hebert, Jr., in the Big Lake area, was drilling in shale at 11,975 ft. Magnolia Petroleum Co. 1 R. A. Moore, 3 miles east of the Black Bayou field, was drilling at 5,100 ft. in shale. Pure Oil Co. 1 State Lease 549-Snake Lake, a 9,500-ft. test in the East Grand Lake area, was drilling at 4,805 ft. in sand.

Vermilion Parish.—Union Oil Co. of California has obtained a permit to drill a 12,000-ft. wildcat test in Lake-14s-2w. It is 1-A State Lease 540-White Lake.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Terrebonne Parish: Humble 1-C Continental Land & Fur Co., 4-18s-15e, dry at 11,540 ft.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OKLAHOMA

Rapid Development Seen at Cement and West Edmond

HAILED as last year's most important discovery, Gulf Oil Corp.'s Medrano sand test, the 1 Sherritt in SE NW NE 33-6n-10w, has definitely extended the area 2 miles west and has proven up a major portion of the western Cement field. With the thickest sand body yet found in the area, 5,770-5,955 ft., operators were preparing to make additional perforations. On last report, the well had flowed better than 400 bbl. of oil in 13 hours through 300 perforations from 5,880-5,930 ft., which is the lower part of the sand zone. The flow was through ¾-in. choke on tubing.

Revised well spacing in the Medrano sand section of the Cement field by PAW was expected to encourage drilling. Previously, operators have drilled in the center of 40 acres and the amended ruling will permit locations in the northeast corner, the southwest corner, or the center. Sections affected include the SW Section 28, the S½ Section 29, NE Section 32, all Section 33, W and S½ NW and SW NE and S½ SE Section 34, S½ S½ Section 36, and S½ SW and SE 36-6n-10w. Also the SW 31-6n-9w, and the W½ 6-5n-9w; all of Sections 1 and 2 and the N½ of Section 3, and NE 4-5n-10w.

Other wells testing the Medrano sand were Magnolia Petroleum Co. 4 Edwards, NW NW 1-5n-10w, at the southeast edge of the zone, which ran high on the sand at 5,378 ft. At the last report cores at 5,430 ft. showed saturation with gas. Anderson-Prichard Oil Corp. was testing the upper Medrano at its 1 Hayes, S½ SE SE 35-6n-10w. This well found production in a conglomerate zone below the Medrano but was plugged back and perforated in the sand at 5,478-90 ft. where it flowed 388 bbl. of oil in 24 hours. The oil was accompanied by considerable gas and these perforations were squeezed off in an effort to lower the gas-oil ratio.

Oklahoma County. — In the new West Edmond pool, Fox & Schmidt 1 Ringer, NW NE SE 31-14n-14w, was brought in for 960 bbl. of oil in 10 hours. The well was drilled to 7,220 ft. After shooting at 6,937-84 ft. it cleaned itself and made 130 bbl. of oil in the first 30 minutes. No potential was given the well as storage was limited to one 1,000-bbl. tank and at the end of the 10-hour test, the flow was pinched to 50 bbl. an hour. Location is a west offset to the discovery. Fox-Schmidt have announced intentions to drill two offsets to the Wagner lease, one in NE SW Section 32 and the other in SW SW 32-14n-4w. They also plan an offset to the 1 Ringer and have acquired the NE Section 32.

Garvin County. — The Pauls Valley pool was extended one more location on its northwest trend at the Texas Co. 1 M. G. Cox, SE SE NW 25-4n-1w. Drilled to 4,067 ft., it was washed in and averaged better than 50 bbl. of oil an hour for 12 hours through tubing before being shut in for connections.

OKLAHOMA WILDCAT COMPLETIONS

Bryan County: Amerada 1 Neff-Godfrey, SE NW SW 22-6s-7e, dry, T.D. 6,282 ft. Viola 4,010 ft., McLish 5,230 ft., Oil Creek 5,656 ft., 50,000 cu. ft. gas at 5,585 ft b.h.p. 1,650 lb.

(Continued on Page 120)

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ILLINOIS

Tar Springs Found Productive In Dale-Hoodville Pool

MATTOON, Ill. — The Dale-Hoodville pool in Hamilton County, which until recently had not produced from any pay above the Cypress sand, is now developing good production from the Tar Springs sand. Texas Co. 1-A Wheeler, NE SW SW 18-6s-7e, total depth 2,462 ft., flowed 237 bbl. through tubing after a shot in Tar Springs sand at 2,416-30 ft. Later it pumped 282 bbl. in 24 hours. A number of wells in Section 18, which have been producing from McClosky lime, have been plugged back and their production very materially increased. Shell 1 Webb was increased from 162 bbl. per day to 222 bbl. producing from Aux Vases and Tar Springs. Shell 3 G. W. Morris went from 8 bbl. per day to 262 bbl. after it was plugged back. Texas 6 J. C. Hall-B increased to 210 bbl. and Pure 1 J. C. Layman, a Cypress sand producer, increased to 227 bbl. when Tar Springs sand was gone into. Dale-Hoodville produces from Tar Springs, Cypress, Bethel, Aux Vases, Levias lime and McClosky lime.

Gilliam & Spillar and Ashland Oil & Refining Co. 1 Sisk-Raley, SE NE NW 15-10s-6e, Saline County, which found gas in Waltersburg sand at 1,485-1,535 ft., estimated at 7,500,000 cu. ft. in volume, was last reported drilling at 2,125 ft., having penetrated Tar Springs at 1,582-90 ft. and Cypress sand at 1,918-26 and 1,940-46 ft. A drill-stem test in Cypress sand developed no oil or water.

Two wildcat near completions are reported from eastern areas. In Jasper County Central Pipe Line Co. 1 M. Heap, in 28-6n-9e, flowed by heads from McClosky lime, and in the Maple Grove area in Edwards County, R. L. Bauan 1-A Gaede, 9-1n-10e, swabbed 20 bbl. per hour from McClosky lime.

Gulf Refining Co. 1 Floyd in SE SE NW 25-1n-3e, Marion County wildcat, was in oolitic lime and finding some saturation, coring from 2,734 to 2,755 ft.

Forty-two new operations were started during the week including the following wildcats: Richland County: Sohio 1 Heap et al, SW SW SW 19-3n-11e; Sohio 1 William T. Balmer, NE NW SW 6-3n-14w; Ashland Oil & Refining Co. 1 Friedly-Provenes, S½ SE NE 4-2n-14w, Edwards County; First National Petroleum Trust 1 Brown, S½ SW SW 6-2s-11e, Clay County; J. P. Washburn and Powers 1, no farm name given, 350 ft. from south and 345 ft. from east lines, SE NW 34-2n-7e, St. Clair County; Eason et al 1 Engle, SE SE NW 29-1n-6w.

ILLINOIS WILDCAT COMPLETIONS

Bond County: Davison et al 1 Berkenstock, NE NW NE 8-4n-3w, dry at 1,064 ft. Benoist sand 1,059-64 ft., shot.

Clinton County: T. M. Conrey 1 Brandt, NW NE SW 11-3n-3w, dry at 1,131 ft. Glen Dean 826 ft., Golconda 877 ft., Cypress 948 ft., Paint Creek lime 1,057 ft., Benoist sand 1,117 ft.

Douglas County: F. J. Burkett 1 W. L. Worley, SE NW NW 31-15n-10e, dry at 1,216 ft., top of Silurian 1,178 ft.

Effingham County: Big Chief Drilling 1 Fehrenbacher, SE SE SW 28-6n-7e, pumped 154 bbl., McClosky lime 3,109-84 ft., acidized, St. Louis lime 3,209 ft. T.D. 3,213 ft.

Fayette County: Skelly Oil 1 L. B. Stericker, SW SW SE 24-5n-1w, dry at 1,652 ft. Hardinsburg 1,162 ft., Golconda 1,180 ft., Barlow 1,259 ft., Cypress 1,297 ft., Paint Creek lime 1,366 ft., Paint Creek sand 1,388 ft., Benoist 1,419 ft., Renault 1,470 ft., Aux Vases 1,478 ft., Ste. Genevieve 1,554 ft., Rosiclare 1,586 ft., Fredonia 1,572 ft., St. Louis 1,644 ft.

John J. Farrelly 1 Noling, SW SE NE 21-7n-1w, dry at 1,501 ft., Glen Dean 1,110 ft. and 1,135 ft., Hardinsburg 1,140 ft., Golconda 1,180 ft., Cypress 1,215 ft., Benoist 1,411 ft.

Franklin County: Smoky Oil Co. 1 Franklin County Mining Co., C NW SW 35-6s-4e, dry at 3,304 ft., Menard 2,346 ft., Tar Springs 2,416 ft., upper Glen Dean 2,487 ft., Hardinsburg 2,550 ft., Golconda 2,644 ft., Barlow 2,754 ft., Cypress 2,860 ft., Paint Creek 2,903 ft., Aux Vases 3,058 ft., Levias 3,097 ft., Rosiclare 3,156 ft., Fredonia 3,216 ft., McClosky lime 3,125-31 ft.

Jefferson County: Nash Redwine 1 Gilbert, NE SE SW 25-4s-2e, pumped 10 bbl. oil, McClosky lime 2,805-12 ft., St. Louis lime 3,004-12 ft., acidized, T.D. 3,050 ft.

Marion County: Glenn O. Briscoe 1 McFadden, SE SW NE 9-2n-3e, dry at 2,166 ft., Glen Dean 1,618 ft. and 1,638 ft., Golconda 1,718 ft., Barlow 1,798 ft., Cypress 1,822 ft., Paint Creek 1,860 ft., Benoist 1,962 ft., Aux Vases 2,038 ft., Ste. Genevieve 2,096 ft., Fredonia 2,150 ft., McClosky 2,159 ft.

Brown 1 Kabala, SW SW SE 9-1n-1e, dry at 1,702 ft., Glen Dean 1,464 ft., Barlow 1,650 ft., Cypress 1,680 ft., no sand.

Richland County: Helmerich & Payne 1 Urfer, SE SE NW 23-5n-10e, dry at 3,069 ft., Menard 2,184 ft., Vienna 2,300 ft., Tar Springs 2,350 ft., Glen Dean 2,420 ft., and 2,425 ft., Hardinsburg 2,443 ft., Golconda 2,469 ft., Barlow 2,614 ft., Cypress 2,668 ft., Weiler 2,744 ft., Benoist 2,788 ft., Benoist sand 2,794 ft., lower Renault 2,868 ft., Aux Vases 2,878 ft., Ste. Genevieve 2,914 ft., no McCloskv lime.

Pure Oil 1 R. M. Rusk, C SW SE 19-3n-9e, pumped 72 bbl., McClosky lime 2,987-92 ft., T.D. 3,055 ft.

Wayne County: Pure 1 Harry Porter, C NW SW 23-1s-7e, pumped 13 bbl. oil, 23 bbl. water, Ste. Genevieve 3,202 ft., Rosiclare 3,215 ft., Fredonia 3,260 ft., McClosky 3,266-75 ft., perfs. at 3,202-10 ft., T.D. 3,275 ft., lies between Geff and Boyleston pools.

APPALACHIAN FIELDS

Helderberg May Prove New Pay at Summit Ridge

PITTSBURGH, Pa.—In South Union Township, Fayette County, the 1 Heyn (Summit Hotel) on Chestnut Ridge, which has been producing since 1936 from the Onondaga chert beds and the Orisbany sand had declined to less than 100,000 cu. ft. gas a day. It was bottomed below the Oriskany sand but the operators decided to deepen it into the Silurian. However, at 7,185 ft. additional gas was picked up which with the exception of one run increased until at 7,345 ft. the volume is in excess of 650,000 cu. ft. The formation is presumably the Helderberg and the deepest of any of the producing wells on structure. Normally, the Helderberg is not considered a producing horizon. It was thought that the odor of the gas has changed slightly but no analysis has been made.

Crawford County.—In East Fallowfield Township, Crawford County, Sylvania Gas Corp. topped the Onondaga lime at 3,242 ft. in the test on the C. D. Troyer farm with the chert placed at 3,266 ft., and it is now drilling at 3,428 ft.

Mercer County.—The deep test of the United Natural Gas Co. on the Maude Davidson farm in Worth Township, Mercer County, is drilling at 6,136 ft. and it is carrying about 70,000 cu. ft. gas from the Newburg. It is thought that there was a gas increase in the bottom of the dolomite.

Westmoreland County.—In Ligonier Township, and on Laurel Ridge, New Penn Development Co. reached 8,720 ft. in the test on the John and Eleanor Beck farm and shut down. The Onondaga lime was placed at 8,650 ft. and the chert at 8,696 ft. The present depth is greater than where gas was first picked up in the Indiana Savings & Trust lease on the Menocher Highway in Fairfield Township.

WEST VIRGINIA

Wirt County.—The Oriskany wildcat of the Columbian Carbon Co. on the Virgie Mason farm in Tucker district topped the Oriskany sand at 5,246 ft. with a gas pay of about 37,000 cu. ft. The sand extended to 5,294 ft. After shot it gaged 135,000 cu. ft. While the gas volume is low, it is encouraging as none of the tests have shown as large a volume in the Parkersburg syncline. The Caplinger test on the west flank of the Burning Springs anticline was dry. In this test the Corniferous lime was topped at 5,117 ft. with a surface elevation of 897 ft.

Wood County.—In Slate district,

(Continued on Page 128)

An oil refinery operating a condenser cooling system found that scale in condenser tubes was slowing up production. Haering engineers were called in to make a survey. Haering Glucosates were applied. In a short time scale began to disappear and gasoline production went up 50 barrels a day.

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N. CENTRAL TEXAS

Three Successful Wildcats Highlight Busy Week

WICHITA FALLS, Tex.—The North Central Texas area had a bumper crop of completions for the week with 16 wildcats, three of them successful, and 32 field tests being reported. There were eight locations abandoned. Work in proven areas resulted in 19 oil wells and 13 dry holes being completed. The total of 48 completions for the area is well above the average of 26 per week registered so far this year and reflects the recent upsurge of activity in the district.

A new Marble Falls pool seemed assured in southeastern Young County by the Lupton and McLester 1 C. W. Johnston, F. M. Diew Survey, 3 miles southeast of Oil City. The well flowed approximately 30 bbl. per hour after drilling 1 foot of Lake sand (Marble Falls) at 3,990-91 ft. It was being killed and preparations made to run casing and liner. The new well is 5 miles south of Deep Rock 1 Morrison, recent Mississippi lime discovery, 4 miles northeast of the Z. Strong Lake sand discovery in northern Stephens County and 3 miles southeast of Lake sand production in the Oil City pool discovered by Mid-Continent Petroleum Co.

In Throckmorton County, B. Sullivan and Anderson-Prichard 1 T. A. Waggoner, Section 775, T.E.&L. Co. Survey, 4 miles southeast of Elbert, topped the Caddo lime at 4,093 ft. with a show of oil to 4,096 ft. On drill-stem test it recovered 30 ft. of oil-cut mud.

Southern Clay County had a possible new oil pool when Continental Oil Co. 1 Hilburn, E. W. East Survey, ran a 45-minute drill-stem test at 6,439-54 ft. and recovered 250 ft. of oil-cut mud and no water. An electrical-logging survey was being run.

At the Chapman & McFarlin 1 Turbeville, a wildcat in Block 182, Glass Survey, 6 miles southeast of Mankins in Archer County, the Mississippi lime was missing and Ellenburger topped at 5,405 ft. The test was abandoned at 5,500 ft.

The Browning pool in northern Archer County appeared to be getting an extension when Strawn sand showing oil was found at 4,952-56 ft. The well is the Phillips Pet. Co. 1 David, J. R. McDowell Survey.

Archer County.—L. T. Burns 14 I. F. Ickert, Lot 17, Crawford Pasture subdivision, produced 477.75 bbl. from lime at 4,458-62 ft. Total depth was 5,165 ft., 6⅝-in. casing set at 5,165 ft. and casing perforated with 10 shots opposite lime at 4,458-62 ft.

Young County.—Anderson-Prichard Oil Corp. et al 1 W. T. Donnell, M. Edmonds Survey, Abstract 254, drilled to 4,768 ft. total depth, ran 5½-in. casing to 4,629 ft., plugged back to 4,600 ft. and perforated casing with 45 shots at 4,184-98 ft. The well flowed 131 bbl. per day.

Wichita County.—Continental Oil 1 G. T. West, G. W. Scot Survey, Abstract 254, produced 154 bbl. per day pumping and flowing from sand at 4,320-60 ft. Total depth was 5,687 ft., plugged back to 4,260 ft. and 7-in. casing set at 4,230 ft.

In the Walnut Bend pool, Cooke County, Winger sand development was encouraged when two wells totaling 2,935 bbl. per day initial were completed by Sinclair Oil Co. Continental Oil Co.'s 1 B. L. Clisbee in the Hildreth pool of Montague County was good for 1,044 bbl. per day and the same company's 1 E. Z. Scheller in the Mueller pool made 1,082 bbl. initial. The McLester pool in Young County had two good completions by the Belfort Oil & Gas Co., the 1 V. Holcomb "A," flowing 50 bbl. per day, and 1 V. Holcomb "B," flowing 70 bbl. per day.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: L. T. Burns 14 L. F. Ickert, Lot 17, Crawford Pasture subd., pay 4,458-62 ft., perf. 10 shots, flowed 477.75 bbl., T.D. 5,166 ft. Discovery.
Chapman & McFarlin 1 J. H. Turbeville, T. Glass Sur., Abst. 141, T.D. 5,500 ft., dry, top Caddo 4,934 ft., top Ellenburger 5,392 ft.
Fortex Oil Corp. 1 E. Colgan, Sec. 2470, T.E.&L. Sur., dry, T.D. 1,554 ft.
L. Sikes 1 Virgil Seay, Sec. 63, J. W. Harris subd., dry, T.D. 1,415 ft.
White and Duncan 1 J. M. Bloodworth, Sec. 12, B.B.B.&C. Sur., Abst. 936, dry, T.D. 1,240 ft.
Young & Burke Royalty Co. 1-A Texas Land & Mortgage Co., Lot 1, W. M. Ainsworth A-1 Sur., dry, T.D. 1,207 ft.
Cooke County: Texas Co. 1 M. L. Townsley, Lot 4, Wm. Slingland Sur., Abst. 897, dry, T.D. 1,033 ft., top Ellenburger 1,998 ft.
Denton County: C. H. Gannon 1 Aetna Life Ins. Co., J. Hines Sur., Abst. 573, dry, T.D. 2,492, top Ellenburger 2,430 ft.
Jack County: Joe A. Worsham 1 T. H. Cherryhomes, M.E.P.&P. Sur., Abst. 423, dry, T.D. 5,256 ft.
Wichita County: Continental Oil Co. 1 G. T. West, G. W. Scott Sur., Abs. 254, pay 4,230-60 ft., sand, T.D. 5,687 ft., pumped and flowed 154 bbl. per day. Discovery.
W. V. Coffey 1 T. B. Michie, 1952 ft. N line and 1,767 ft. E line, Lot 9, Blk. 24, N. Ferguson subd., L Netherly Sur., Abst. 240, dry, T.D. 1,812 ft.
Wilbarger County: Humble Oil & Refining Co. 1 Mary Schmoker, Sec. 114, Blk. 14, H.&T.C. Sur., dry, T.D. 6,449 ft., top Ellenburger 6,430 ft.
Jack Story 1 W. Y. Waggoner est., Sec. 39, Blk. 4, H.&T.C. Sur., dry, T.D. 1,932 ft.
Young County: Anderson-Prichard Oil Corp. et al 1 W. T. Donnell, M. Edmonds Sur., Abst. 91, pay 4,184-98 ft., perf. 45 shots, flowed 131 bbl. per day, T.D. 4,768 ft. Discovery.
Standard of Texas 1 R. T. Wells, Sec. 738, T.E.&L. Sur., dry, T.D. 4,851 ft.
R. V. Tidwell 1 T. A. Harty, M. Edmonds Sur., Abst. 91, dry, T.D. 3,969 ft.

WEST CENTRAL TEXAS

ABILENE, Tex.—While a number of interesting tests were drilling in the area, none of them had reported reaching the critical stage during the past week. Humble Oil & Refining Co. announced location of its 1 Wiltbanks, 660 ft. from north and west lines, Section 5, Block 14, H.&T.C. Survey, Haskell County. It is a rotary test located approximately 5 miles southwest of the town of O'Brien.

In Jones County, the most active in the area, Merry Brothers and others made location for a cable-tool test on its 1 W. D. Hawthorne, 330 ft. from north and west lines of 120-acre lease, Section 204, J. W. McKissick Survey. Watchorn Oil & Gas Co. was rigging up rotary on its 1 E. E. Farnsworth, 10 miles southwest of Anson. Location is 2,000 ft. from north line and 400 ft. from west line of 200-acre lease in Lot 4, S. Jones Survey, Abstract 266. Great Lakes Carbon 1 C. N. Humphreys, 660 ft. from south and west lines of 420-acre lease, Section 2, Block 4, H.&T.C. Survey, had a hole full of water and was underreaming casing 2,520 ft. Hunter & Hunter 1 Fields, 660 ft. from south and west lines of N½ Section 48, Block 15, T.&P.R.R. Survey, was drilling below 5,144 ft. with a scheduled depth of 5,200 ft.

The old Leeray gas pool in Eastland County became interesting when Premier Oil and Woodley Petroleum Co. 1 G. W. Thorp, Section 456, S.P. Survey, made an estimated 15,000,000 cu. ft. of gas at 3,600-10 ft. If no oil is found while drilling the well to the Ellenburger the well will be plugged back and completed as a gasser.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Shackelford County: Fain & McGaha 1 J. A. Mathews, 1,020 ft. S line and 1,200 ft. east line Sec. 1, E.T.R.R. Sur., dry, T.D 985 ft.

Oklahoma

(Continued from Page 117)

Bert Fields 1 Wilson, NE NW 13-5s-12e lost hole at 810 ft.
Kay County: Phillips Pet. 1 Cather, SE SW NE 24-27-2w, dry, T.D. 4,331 ft Wilcox 4,079 ft., Arbuckle 4,250 ft.
Logan County: Jordan Pet. 1 Hatcher, SE SW 22-16n-1e, dry, T.D. 5,172 ft Avant 3,210 ft., Big lime 4,515 ft., Pr 4,620 ft.
Pawnee County: E. S. Adkins 1 Kelly, NW NW SE 7-20n-5e, dry, T.D. 3,977 ft. Bartlesville 3,497 ft., Viola 3,922 ft., Wilcox 3,957 ft.

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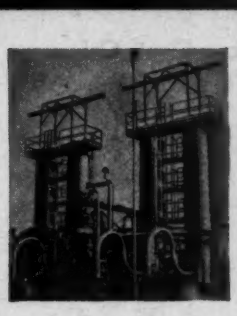

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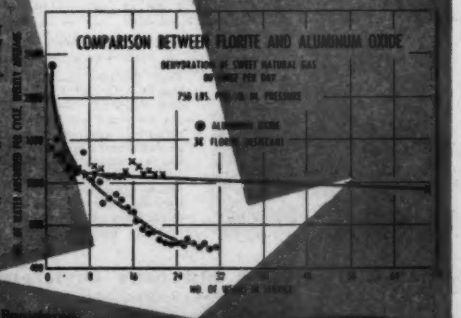

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KANSAS

Dickinson Has First Oil Well in Burgess Sand

DICKINSON County was given its first oil well at Mutual Oil Co. 1 Miller, in CSL SE SW 30-14-1e, 12 miles east of the Salina pool, the nearest production, and just across the county line. At the end of the week there was 1,600 ft. of oil, with no water, standing in the hole and operators were preparing to swab. Pay zone is the upper 2 ft. of the Burgess sand found at 2,483-2,518 ft.

Zenith and Peace Creek pools.—The Kansas Corporation Commission has decided to let these two pools remain separate for proration purposes. It is said that there is evidence of a faulting condition between the fields in the SW 32-23-10w. In the NW NW 5-24-10w, and the second well directly connecting the two pools, Shell Oil Co., Inc., 1 Paine flowed 234 bbl. of oil in 3 hours. Pay in the Viola lime was at 3,670-3,717 ft.

New field potentials.—The Corporation Commission has also announced new potential tests to be started August 30 in 11 pools. These are the Drach, Fisher, Gates, Max-Arbuckle, Max-Kansas City, Shaffer-Kansas City, South Sittner-Arbuckle, Snider-Simpson, South Snider-Simpson, St. John and Hilger pools, all in Stafford and Reno counties. Operators in these fields should contact the Kansas Corporation Commission office at Great Bend to make arrangements for their tests.

McPherson County. — The Lindsborg pool was extended south last week at the Bay Petroleum Co. 1 Lundstron, W½ SW SE 36-17-4w. No potential was given but there was nearly 3,000 ft. of oil standing in the hole from the Viola lime at 3,381-83 ft. It is the first well to be brought in across the Smoky Hill River.

KANSAS WILDCAT COMPLETIONS

Barton County: Ed Jonas et al 1 Ames, SE SW SE 22-18-11w, flowed an average of 27 bbl. an hr., acidized and pumped 287 bbl., gravity 46, Lansing 3,042-49 ft., T.D. 3,329 ft. Discovery of Ames pool.

M. M. Price 1 Johansen, SW SE 5-16-11w, dry, T.D. 3,397 ft., Lansing 2,998 ft., Arbuckle 3,394 ft., shows of oil 2,910 ft., 3,017 ft., 3,030 ft.

Kingman County: Stanolind Oil & Gas 1 W. C. Sample, SE SE NW 2-29-8w, dry, T.D. 4,709 ft., Lansing 3,440 ft., Simpson 4,523 ft., Viola 4,500 ft., Arbuckle 4,634 ft., show oil and gas in core at 4,487-4,500 ft.

Norton County: Phillips 1 Irma, NE NE SE 30-5-21w, dry, T.D. 3,786 ft., Lansing 3,484 ft., Lamotte 3,738 ft.

Pratt County: Hollow Drlg. and National Ref. 1 Huffman, NW SE 17-26-12w, dry, T.D. 4,413 ft., Lansing 3,673 ft., Viola 4,198 ft., Simpson 4,281 ft., Arbuckle 4,393 ft., shows of oil 3,886 ft., 3,970 ft., 4,198 ft., 4,258 ft.

Rooks County: National Assoc. Pet. 1 Hansen, NW NW NW 15-6-20w, dry, T.D 3,688 ft., Lansing 3,442 ft., granite wash 3,675 ft., show oil 3,442 ft., 3,481 ft.

Shawnee County: C. W. Murchinson 1 Federal Land Bank, SE SE SE 36-10-15e, dry, T.D. 2,885 ft., Lansing 823 ft., Hunton 2,347 ft., St. Peter 2,735 ft., Arbuckle 2,865 ft.

Rocky Mountain Area

(Continued from Page 108)

the 7-in. at 1,965 ft., and drilled to 1,991 ft. It showed for 4,500,000 cu. ft. of gas in the Ellis-Madison at 1,972-91 ft., with some bottom water. It is not yet a completion. It ran a squeeze job in an attempt to shut off the water and is drilling out cement.

Water in Madison at Gooseberry.—General Petroleum 1 Government, NW SW NW 28-47n-100w, Gooseberry dome, Park County, Wyoming, after drilling 484 ft. of the Madison lime, topped at 6,468 ft., and finding water in that horizon, is plugging back to test the Embar at 5,665-5,714 ft.

Show in Madison in Devonian test.—Jarvis, Taylor 1 Goggin, C NE SE 7-27n-5w, a Devonian test in the Pendroy district, Teton County, Montana, topped the Madison at 2,542 ft., cored from 2,546-51 ft., but recovered only 10 in. of the core which showed saturation. A drill-stem test showed 150 ft. of oil and 50 ft. of drilling mud. It is continuing on to the objective.

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PERMIAN BASIN

Completion of Andrews County Discovery Delayed by Fishing Job

MIDLAND, Tex.—The new pool forecast for Andrews County by the Union Oil Co. of California I J. D. Biles, NW NE Section 19, Block A-31, Public School Land, was delayed last week when a portion of the drill stem became lost in the hole. In the meantime it was announced that plans were being made to lay 5 miles of 4-in. line from the Fullerton pool to the new strike. The well is located 4½ miles northwest of the Fullerton pool and is producing from the same pay horizon, Clear Fork lime, which has led some to class it as an extension of the Fullerton pool.

Total depth of the well is 7,464 ft. with the 5½-in. casing landed on bottom and perforated with 38 shots at 7,431-41 ft. The well flowed 240 bbl. of oil in 36 hours through the tubing. The oil is reported to be approximately 46° gravity and good lubricating quality. The tubing being used for drill stem has been recovered and preparations under way to reperforate, acidize and complete the well.

Gaines County.—Magnolia Petroleum and Atlantic Refining 1-459 Havemyer and Jenney, Section 459, Block 9, C.C.S.D.&R.G.N.G. Survey, northwestern Gaines County, recovered 150 ft. of oil and gas-cut mud from drill-stem tests at 7,430-51 and 7,528-7,625 ft. and was drilling ahead. The test is ½ mile south of the Shell 1-D Leaverton, discovery well of the Russel pool. One-half mile to the west of the discovery well, Continental 1-A Dr. E. H. Jones, SW SW NE 22-A7-PSL, was drilling at 7,312 ft.

Amerada Petroleum Corp. 6 Robertson, Ordovician wildcat on the east side of the Seminole pool, Gaines County, was drilling below 9,175 ft. The well is located in Section 196, Block G, W. T. Survey. Stanolind 15 American Warehouse, SE NW SE Section 5, Block A, D.&W. Survey, was repairing equipment at 11,051 ft. and had established a depth record for that part of the basin. Drilling has been resumed at Humble 1 Crews & Mast, SW SE Section 8, Block A-34. Public School Land, a 3-mile north and west outpost of the Means pool in Andrews County. Depth is 8,564 ft. and drill pipe has been changed. C. U. Bay 1-A Humble-Austin, 1,980 ft. from south and east lines, SE Section 190, Block G, W. T. Survey, has been staked in the extreme southeastern part of the Seminole pool in Gaines County.

Winkler County.—A new location for southeast Winkler County is the Stanolind 1 Sealy-Smith, 660 ft. from south and west lines, Section 50, Block A, G.&M.M.B.&A. Survey, Sinclair Prairie 4-A Walton, ¾ mile southeast of the Carter 2 Walton in Winkler County, Ordovician discovery, has spudded. Eight and one-half miles southeast of the Carter discovery, Sinclair Prairie 1 Seth Campbell, SW SW Section 11, Block B-5, Public School Land, was drilling below 4,000 ft. on its way to test to 11,000 ft. The well is 13½ miles from the Stanolind and Shell 1 Blue, discovery well of the Wheeler-Ellenburger pool.

There were 11 new wells completed in the Slaughter pool during the week. The remainder of the field work was scattered.

The lone discovery of the week in the area was in Pecos County and was extremely light. It is reported below.

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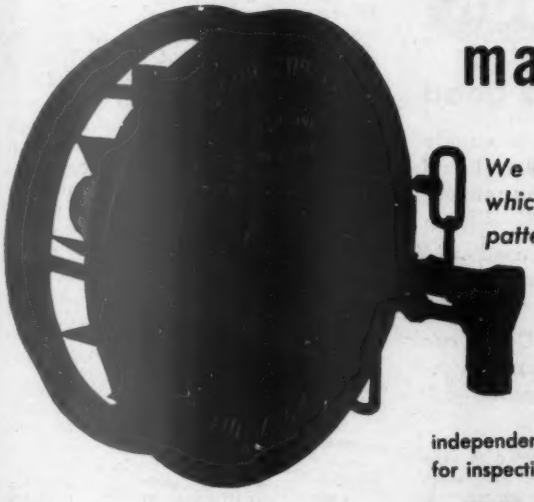

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tion 6, Block N, H.&O.B. Survey, Hale County, reached 7,425 ft. on its way to a proposed 10,000 ft. The well is located 12 miles southeast of Plainview and is in the area between the Permian basin and the Panhandle. Stanolind Oil & Gas Co. was moving in tools for its 1 W. H. Green, Labor 36, League 320, Capitol Land Survey, Oldham County, with the test scheduled to go 7,500 ft. In Childress County, J. A. Murphy 1 S. J. Clark, SE NW Section 6, Block 9, H.&G.N. Survey, was a scheduled 5,500-ft. test.

WEST TEXAS WLDCAT COMPLETIONS

Pecos County: Magnolia 1 State-Powell, 1,980 ft. SE line and 660 ft. SW line of lease, Sec. 96, Blk. 10, H.&G.N. Sur., elev. 2,405 ft., pay 3,539-57 ft., flowed 83 bbl. fluid, 70 per cent water, gravity oil 21.9°, flowing from water drive with no free gas. Discovery.

Standard of Texas 1 Douglas Oil, 660 ft. E line and 660 ft. S line, Sec. 9, Blk. 194, G.C.&F. Sur., elev. 2,595 ft., T.D. 9,114 ft., P.B. 8,733 ft., acidized 17,000 gal., dry, top Yates 865 ft., Brown lime 1,440 ft., Pennsylvania 6,530 ft., Tulip Creek 7,850 ft., Ellenburger 8,732 ft.

SOUTHEASTERN NEW MEXICO

HOBBS, N. M.—Humble Oil & Refining Co. had started operations and set 9⅝-in. protective casing to 3,020 ft. in its 1 Federal-Leonard Oil Co., Section 12-26s-17e, Lea County, New Mexico. The well is located 7½ miles north of the deep Ordovician development in Winkler County, Texas.

In Chaves County, Humble had staked its 1-N State, 660 ft. from south line and 1,980 ft. from west line, SE 35-14s-17e. It is a proposed 7,500-ft. test of the Manning dome and the nearest previous test is 20 miles to the southeast. The location is near the town of Elk, 50 miles southwest of Roswell.

In western Lea County, McLaughlin and Cosden Petroleum Corp. 1 State, 2 miles northeast of the Maljamar field, failed to flow naturally from sand drilled to 4,202 ft. and preparations were being made to stimulate it with either acid or a shot, or both.

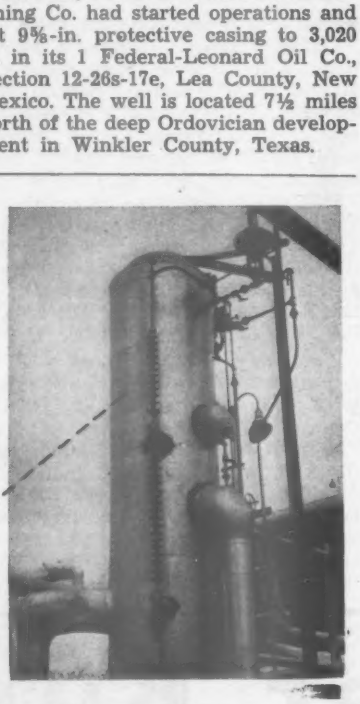
N. G. Penrose announced two wildcats in Lea County. Penrose 1 State, NE SW 11-15-35, Lea County, is contracted to 5,600 ft. but may go to 11,000 ft. Penrose 1 A. C. Crozier, SW NW 1-2-33 is a 3,700-ft. cable-tool test.

NEW MEXICO WILDCAT COMPLETIONS

Lea County: Featherstone 1 Keel, NW SE 33-18s-32e, 4 mi. NE of Luke pool, dry, T.D. 4,861 ft., top anhydrite 1,240 ft., top salt 1,335 ft., base sale 3,872 ft.

San Juan County: Continental Oil 1 Biolah-Bi-To, 1,650 ft. N and E lines, 13-30n-21w, dry, T.D. 4,840 ft., salt water 4,595 ft., Mississippian.

The Eye Line is the Check Line



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California Fields

(Continued from Page 115)

as the Sesnon zone below the zones being produced by Tide Water on the Porter lease in the Aliso Canyon field. Now Standard has stepped out to Section 29 and has started a test on the Frew property which is west of the Sesnon lease in Section 28. The Company's 1 Frew is not deep enough to be of special interest at this time but will be watched with interest within another 30 days when the bit has gone down into the Modelo of Miocene age. General Petroleum's work in this region is a wildcat in Section 22 north of Tide Water's properties in the Aliso Canyon field. This wildcat is 1 Mendota and it has shown considerable encouragement since being started. The northern end of the Aliso Canyon field is very badly faulted and broken up and for this reason it is difficult to ascertain what lies below the surface formation without drilling. In several wells the formations have flattened out with depth indicating that not all of the faults involved are deep seated.

CALIFORNIA WILDCAT COMPLETIONS

San Joaquin Valley

Porterville wildcat district, Tulare County: Tide Water Associated Oil Co. 54-34 C.H., 34-21s-26e, dry, T.D. 2,709 ft., bottomed in basement slate.

Los Angeles Basin

Montebello wildcat district, Los Angeles County: Continental Oil Co. 1 Baldwin, 3-2s-11w, dry, T.D. 5,879 ft., bottomed in lower Miocene shale and gray sand.

Coastal District

Piru wildcat district, Ventura County: Del Rey Petroleum Co. 3 Lisk, 22-5n-18w, dry in gray Sespe sand, T.D. 2,808 ft.

Rincon wildcat district, Ventura County: Shell 1 Tomson, 8-3n-24w, dry, T.D 9,704 ft., redrilled to 8,670 ft.

OHIO, KENTUCKY

New Clinton Sand Pool in Perry County, Ohio

ZANESVILLE, Ohio.—A new pool was discovered by the Preston Oil in Section 31, Monroe Township, Perry County. The new pool is just east of an old field in which the company has been running one or more strings continuously. The well flowed 90 bbl. from the Clinton sand at 3,674-3,709 ft. The discovery, Pennsylvania Grade, is expected to be of limited extent and have a reserve of 450,000 bbl.

The recent oil discoveries have stimulated extensive leasing activity, extending from southern Perry County north through western Muskingum County and central Coshocton County. A number of companies from outside the state have taken acreage and have made locations or will start operations when their leasing is completed. The area west of Zanesville is expected to get the greatest play due to the available acreage and spread discoveries. The oil from the Clinton sand in this area is paraffin base with a high gravity.

OHIO WILDCAT COMPLETIONS

Coshocton County, Lafayette Township: Ohio Fuel 1 Charles J. Zimmer, Lot 8, Clinton 4,136-78 ft., dry, T.D. 4,265 ft.

Lorain County, Penfield Township: Ohio Fuel 1 Ida M. Sears, Lot 117, Clinton 2,360-72 ft., dry, T.D. 2,471 ft.

Perry County, Monroe Township: Preston Oil 224 Sunday Creek Coal Co., Sec. 31, Clinton 3,674-3,709 ft., 90 bbl. and 134,000 cu. ft., T.D. 3,717 ft.

INDIANA

EVANSVILLE, Ind.—Two relatively small oil wells and a dry hole comprised Indiana's completions of the week, one oil well each in Posey and Gibson counties, and a dry hole in Posey County.

EASTERN KENTUCKY

ASHLAND, Ky.—Drilling operations in the Eastern Kentucky area continued unchanged this week. For the first time in 4 weeks no completions were reported and only one location was made.

A study of drilling reports reveals that several wells are near what should be completion depth.

No new trends have been developed and the recent "evening up" of crude-oil price has not apparently stirred any wildcat activities.

Sources here who requested that their names not be used seem confident that it will take a definite increase in the price of crude oil to bring needed wildcatting and that this would be needed to avert a greater crude shortake.

They said that approval by the Office of Price Administration of the recommended increase now before OPA would, without doubt, bring a sharp upward swing in drilling operations.

WESTERN KENTUCKY

OWENSBORO, Ky. — In Webster County, B. B. Hamilton et al 1 A. B. Sellers, a wildcat 2½ miles north of Sebree, shows for a 250-bbl. well on the pump from Tar Springs sand at 1,872-92 ft., total depth. Same operators in 2 Sellers, after finding McClosky lime dry at a total depth of 2,725 ft., plugged back and shot Cypress sand at 2,236-60 ft. and have a 100-bbl. prospect, the first Cypress sand well in the neighborhood.

Five wells were completed in Union County, three oil wells and two dry holes. H. H. Weinert 4 F. Greenwell, completed in McClosky lime at 2,560-70 ft., started at 500 bbl. per day, natural flow.

In Henderson County, Gulf Refining Co. 6 Morehead is a Cypress sand well starting at 300 bbl. per day. Pay at 2,300-06 ft.

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CANADIAN FIELDS

Gas Field Opened Up Near Alaska Highway

CHATHAM, Ont.—On the Pouce Coupe structure, west of Peace River and 26 miles northeast of Dawson Creek, Alaska Highway Oil & Gas 1, LSD 16, 22-80-13w6, deepened to 2,158 ft., developed a flow of 5,500,000 cu. ft. of gas daily, with closed-in pressure of 600 lb. Production comes from the Bullhead sandstone in which 7-in. casing was set. The gas tested 970 B.t.u. Location was made by J. L. Irwin of Calgary for Bonanza Royalties, and the test was completed by Alaska Highway Oil & Gas Co., sponsored by L. R. Champion and associates of Montreal. Mr. Irwin has mapped a very large structure with closure on the north where a reverse dip of over 300 ft. in the strata is indicated. Gas from No. 1 well will be used to drill a second test, and may be piped to Dawson Creek this fall. Guardian Oil Co. 1, 7-80-12w6, 3 miles to the southeast, which has been standing for some months, is preparing to test oil and gas showings around 4,778 ft. after plugging back from about 7,000 ft.

Lloydminster.—In the Lloydminster field, eastern Alberta, R. L. Shaw Sparky 1, LSD 8, 32-49-1w4, drilled by C. E. Mills, has encountered oil at 1,990 ft. with indications that it will be one of the largest producers in the Lloydminster-Vermilion area. The field is about 4 miles west of the Lloydminster gas area in Saskatchewan. Additional drilling will be undertaken.

Athabaska. — In the Athabaska field, northern Alberta, Deca 2, LSD 3, 16-66-23w4, finished at 1,686 ft. with a gas flow estimated between 15,000,000 and 25,000,000 cu. ft. daily, has been capped. Plans are being made to pipe the gas about 6 miles to the town of Athabaska, where a franchise is being negotiated. Deca 1, LSD 1, 4-66-22w4, is rigging. Deca 3 has been spotted on the shore of Bleak Lake, about 1 mile south and west of Deca 2. New equipment and an additional crew will be brought in for this test.

Turner Valley Conservation. — Adoption of a new conservation plan to control gas and oil production in Turner Valley is being considered by the Alberta Conservation Board. The plan worked out by T. R. Weymouth contemplates the conservation and utilization of all the gas production, much of which has been heretofore wasted.

A new order issued by the Alberta government has authorized the Conservation Board to permit production of gas from Royalite Oil Co. wells in excess of the amount fixed by previous quotas under the Brown plan, with provision that other companies affected by the excess production are to be permitted to share in the revenue from the excess gas. Excess production was authorized to meet emergency demands for gas in the manufacture of isobutane and ammonium nitrate, two essential war materials.

Outpost produced. — In the North Turner Valley extension, British Dominion 5, LSD 5, 17-21-3w5, most northerly Turner Valley well, has produced more than 43,048 bbl. of 40.8-gravity crude since completion June 14, though part of this time production tests were in progress. For a time the well, finished at 8,598 ft. with the Madison at 8,169 ft., flowed at the rate of close to 5,000 bbl. daily, the allowable being ultimately settled at 950 bbl. daily, the highest in the field. Location is ½ mile north and northwest of the previous outpost producers.

Turner Valley lime tests.—In the North Extension, Imperial-Hudson's Bay 14, LSD 13, 8-21-3w5, finished at 8,801 ft. with Madison limestone at 8,202 ft. The well faulted from the lime at 8,320 ft. but reentered the formation at 8,366 ft. to drill through both upper and lower zones. It is testing production.

Northwest-Hudson's Bay 13, LSD 9, 8-21-3w5, west side test, finished at 9,435 ft., around 5,000 ft. below sea level. This test got its first lime at 7,420 ft., with upper zone at 7,380 and lower at 7,540 ft.; then faulted to the Kootenay to reenter the Madison at 8,985 ft. and drill through another complete upper and lower porous sequence. Liner has been run to 9,265 ft.

In the North Central area, Royalite Oil 67, LSD 2, 2-20-3w5, has finished at 8,159 ft. with Madison at 7,630 ft. and is acidizing and testing. Production at this point will open a large area previously untested.

In the southwest extension, Imperial-Hudson's Bay 15, LSD 1, 8-18-2w5, is below 8,019 ft. with Madison lime at 7,798 ft. Results at this well will have an important bearing on the further extension of the field to the south. It is ¼ mile east and north of Brown Oil Corp. 6, the most southerly producer, and got the Madison 660 ft. higher.

Lake Erie test.—In Ontario, work will be started this week by Stover & Rawlings of Chatham on a test for West Petroleums of Toronto to be drilled in the bed of Lake Erie, opposite Romney Township. Location will be approximately a mile offshore, in water between 30 and 40 ft. deep, at a point where the drill is expected to tap heavy gas production trapped in the Guelph-Niagara formation under the bed of the lake.

EASTERN TEXAS

Much Development Promised For Carthage Gas Pool

DALLAS, Tex.—The Carthage gas pool in Panola County appeared to be in for considerable development with the filing of intention to drill on 22 locations on Carthage Unit of Glassell & Glassell of Shreveport. Gas production is from the lower Glen Rose lime at approximately 6,000 ft.

The Manziel Paluxy pool in Wood County had a failure on the east side and a success on the north edge, the south offset to which was dry. The failure was the Shell Oil 1 Sheppard, J. Polk Survey, a southeast outpost to the pool. The well appeared to be on the way to successful completion but failed to produce and was abandoned at plugged-back depth of 6,405 ft. The success was the Amerada Petroleum Co. 1 Rogers, J. Polk Survey, which pumped 88 bbl. of 32.5° gravity oil through perforations at 6,300-6 and 6,308-29 ft. Total depth is 6,441 ft.

The Tri-Cities distillate pool in Henderson County was extended when the Stanolind D-1 Tri-Cities Unit, 830 ft. from south line and 2,925 ft. from west line, Wiley Kay Survey, was completed for 203.58 bbl. of 58.1 distillate through 290 perforations at 7,566-95 ft., lower Glen Rose lime. The well followed the pattern of the two previous completions in the area, being drilled to the Travis Peak and then tested and plugged back. Travis Peak was topped at 8,330 ft. and the hole drilled to 8,673 ft. The well flowed 1,125,000 cu. ft. of gas and 2 bbl. of 50° to 55° gravity oil with packer at 8,380 ft. Plugged back to 8,250 ft., the well flowed 1,125,000 cu. ft. of gas through a ⅜-in. choke before being plugged back to completion depth.

The Quitman pool of Wood County, extended last week 1 mile southwest and ¾ mile northeast, had two new locations around the northeast extension. The wells were the C. L. McMahon 2 Pinkie Taylor and the Rogers Lacy 2 Rapp-Turner, both in the H. Anderson Survey.

Recent mechanical failure of Jackson and Fisher 1 McCorley in H. Anderson Survey, northern Wood Coun-

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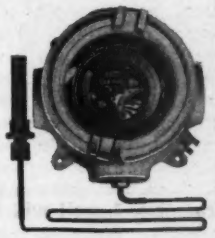

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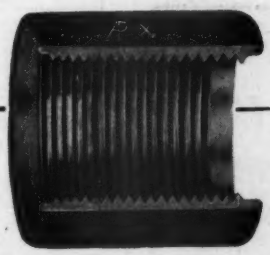

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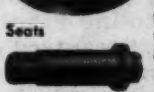

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ty Oak Grove area, resulted in the staking of the 1-B McCorley, 330 ft. from the north and west lines of the lease. The first well had a showing of oil in the Woodbine sand before the hole was lost.

In the Pittsburgh area of Camp County, H. S. Moss Petroleum Co. B-1 Venters unit, Robert Myers Survey, was swabbing 10 bbl. per hour with the total depth 8,140 ft.

EAST TEXAS WILDCAT COMPLETIONS

Houston County: Grier Bros. et al 1 W. W. Spence, J. D. Procella Sur., elev. 445 ft., dry, T.D. 6,147 ft., top Midway 3,054 ft., Navarro 4,188 ft., Pecan Gap 4,638 ft., anhydrite 5,670 ft., Woodbine 6,097 ft., salt water.

Appalachian Fields

(Continued from Page 119)

Wood County, the two Oriskany wildcats of the United Fuel Gas Co. have both topped the Corniferous lime and after casing are ready to drill through to the Oriskany sand. No. 5263 F. R. Hart topped the Corniferous at 4,699 ft. and No. 5264 J. A. Goudy reached this formation at 5,167 ft. Both are distinct wildcats.

Boone County.—Owens, Libby-Owens Gas Department is drilling at 5,090 ft. in the wildcat test on the Coal River Mining Co. in Peytona district, Boone County, with the Newburg placed at 4,822-33 ft. and void of any showing.

Standard Plans Test Near Morristown, N. J.

NEW YORK.—The Standard Oil Co. of New Jersey announced that it plans to drill a deep well in search of oil or gas near Morristown, N. J. The plan, which results from an agreement just concluded with Harold C. Bishop, independent oil man, will be carried out only if Mr. Bishop succeeds in obtaining an adequate block of oil and gas leases from property owners within a 12,000-acre area in Harding and Morris townships. Actual drilling may begin within 60 days and will be done by the Carter Oil Co., Standard's producing subsidiary.

The company stated that the prospect of oil being found is slight, but pointed out that the East Coast shortage and wartime needs warrant taking a long chance on finding oil in New Jersey.

"Biologic studies which have been made of New Jersey in past years have provided no great basis for belief that oil could be found in commercial quantities in the state," the company said, "and our agreement with Mr. Bishop should not be interpreted to mean that prospects there are any better now than in the past. No new information as to the possible presence of oil has been uncovered.

"Before the war, when oil discoveries were keeping pace with consumption, there was no reason to drill for oil in areas offering so little possibility of success. Today with the nation facing a critical shortage of petroleum on the East Coast, we are impelled to pursue even a remote possibility of establishing a supply of crude oil in this area. We are willing to risk something more than $100,000 to determine whether the structure which Mr. Bishop has selected as the most promising in New Jersey will produce oil in commercial quantity.

"The well to be drilled near Morristown will be the first really deep well drilled in New Jersey. Several shallow wells drilled along the coast some years ago failed to produce.

"We expect to drill at least a mile deep and will go deeper if there is any promise of production. Once drilling is undertaken, a depth of 5,000 ft. will be reached in from 60 to 90 days."

Exact location of the drilling site has not been selected, the company said, emphasizing that final action on the project will depend upon Mr. Bishop's success in obtaining necessary oil and gas leases.

Texas Gulf Coast

(Continued from Page 111)

drilling at 7,875 ft. in shale, with streaks of sand, at 1 C. L. Hensley

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et al, a 9,000-ft. test 5 miles south of Lolita.

Polk County.—Humble has staked location for 3-B W. T. Carter & Brothers, wildcat test 3 miles northwest of the Segno field.

Lavaca County.—O. C. Garvey et al has staked location for 1 Lell, wildcat test 4 miles southwest of Hallettsville.

TEXAS GULF COAST WILDCAT COMPLETIONS

Jackson County: Hewitt & Daugherty 1 Mary E. Traylor, 2 mi. NE of Texana, dry at 6,525 ft.

NORTH LOUISIANA

Cotton Valley Is New Pay Zone at Mount Holly

SHREVEPORT, La. — The Mount Holly field of Union County was reported to have gained a second pay in the Cotton Valley zone but details as to pay tops were no announced. The well is Atlantic Refining Co. 1 Lewis, SE NW 15-17s-18w, which was being reworked. It was said to be flowing 6½ bbl. of oil an hour from the Cotton Valley and 7½ bbl. an hour in the Travis Peak.

In the Homer pool, Frankel Brothers 1 Muslow, NE NW 30-21n-7w, has made additional flowing tests, the best of which was 532 bbl. in 24 hours through ¼-in. choke. The electric log indicated another pay at 4,232-49 ft. and a gas-distillate formation at 4,208-27 ft.

ARKANSAS WILDCAT COMPLETIONS

Ashley County: Union Producing Co. 1 Crossett Lbr. Co., S½ NE 2-19s-7w, dry, T.D. 6,865 ft., Wilcox 1,487 ft., Midway 2,125 ft., gas rock 2,653 ft., Cotton Valley 3,010 ft., Smackover 5,080 ft., salt 5,697 ft., elevation 127 ft.

MISSISSIPPI

JACKSON, Miss.— California Co., which recently completed a discovery in Lincoln, seems in a fair way to get another in Adams County. Its 1 National Gasoline Co. of Louisiana, Inc., 16 miles east of Natchez, is at total depth of 10,383 ft. in sand, and set 7-in. casing at that depth. It is reported to have encountered a gas sand at 10,165-75 ft., a gas-distillate or light oil sand at 10,175-93 ft., shale at 10,193-10,223 ft., and gas-distillate or light oil at 10,223-53 ft. It is waiting for cement to set. Active lease and royalty buying in this area is reported. Temporary abandonment of Pure Oil Co.'s 1 J. M. McDowell, 6 miles southwest of Natchez is announced. Mechanical troubles were encountered. It is believed a well eventually may be completed. Humble Oil & Refining Co. was coring at 7,849 ft., probably in the Tuscaloosa. Humble has started drilling operations at its 1 Robinson Land & Lumber Co., 2-6n-7w, Wayne County.

Gulf Refining Co.'s 1 Aden Davis, 15 miles northeast of Laurel, in Wayne County, at total depth of 7,100 ft. and top of cement plug at 6,686 ft., was flowing through testing tool, and when the flow dropped to 27 bbl. daily the testing tool was pulled. The crew recovered 2,700 ft. of salt water in the 2-in. tubing, drilled out to 6,690 ft. and made a drill-stem test of the cement job, setting retainer at 6,656 ft. At latest report the well was waiting for cement to set.

William Helis et al were coring at 9,200 ft. in sand at 1 T. H. Dinkins, 28-5n-11e, Lawrence County. California Co. was coring at 10,220 ft. at 1 Hettie Smith unit, Lincoln County. Harry I. Morgan was drilling at 3,800 ft. in sandy shale at 4 L. N. Dantzler, 30-2s-12w, Stone County.

MISSISSIPPI WILDCAT COMPLETIONS

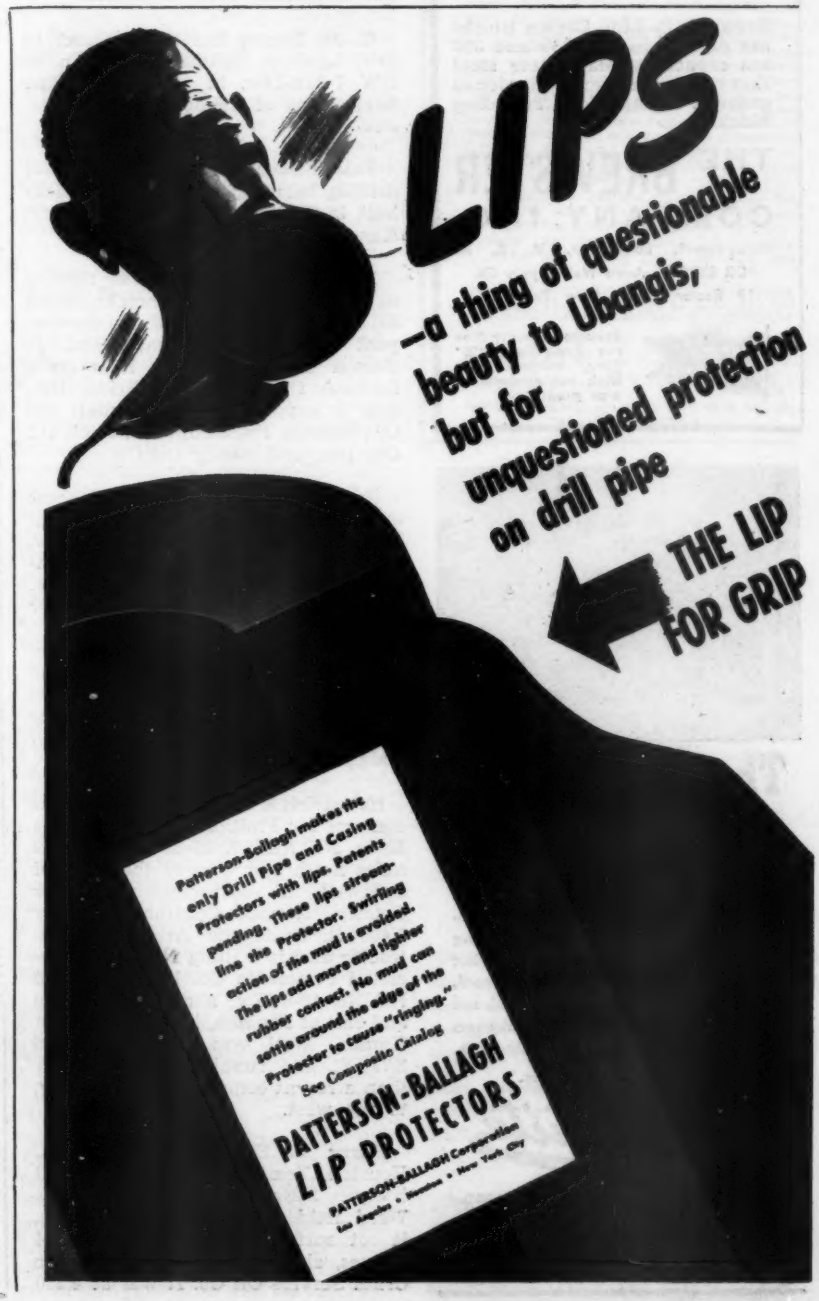
Green County: Gulf Refining Co. 1-A Green County, NW SW 16-3n-7w, dry, T.D. 2,135 ft.

Madison County: Tip Ray and Harry Morgan 1 Geo. Harper, NW SE 9-10n-4e, dry, T.D. 6,510 ft., Eutaw 5,162 ft., Tuscaloosa 5,950 ft., Marine Tuscaloosa 6,378 ft.

ALABAMA COMPLETIONS

Monroe County: J. L. Duffy et al 1 W. S. Moore, SE SE 28-7n-5e, dry, T.D. 5,562 ft.

Tuscaloosa County: Stanolind Oil & Gas 1 G. B. Sandeel, NE SE NW 2-18s-9w, dry, T.D. 5,410 ft., Bangor 2,292 ft., core recovered gray and brown dense lime at 5,383-88 ft.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Among the Drilling Contractors

Parker Drilling Co. has been awarded the contract to drill Midstates Oil Co. 1 J. H. Whaley-A, in NE 4-23n-8w, Claiborne Parish, Louisiana.

C. M. Bagley has the contract to drill Lewis & Bauman 5 Vaughn, in NW 7-21n-14w, in the Caddo Pine Island area of Caddo Parish, Louisiana.

Falcon-Seaboard Drilling Co. was drilling below 3,340 ft. on its 1 Blackhall, in SW SE 7-21-8w, Rice County, Kansas.

Mercury Drilling Co. was moving in rotary tools for 1 Hammeke, in SE SE 12-19-12w, west of Lanterman pool and east of Great Bend, in Barton County, Kansas. It is on a farmout from W. C. McBride, Inc., and is supported by Barnsdall Oil Co., Phillips Petroleum Co., Shell Oil Co., Inc., and Skelly Oil Co.

Parker Drilling Co., Tulsa, was drilling ahead at Gulf Oil Corp. et al 1 Springs, NW NW SW 16-2n-7w, southeast edge of the Marlow townsite in Stephens County, Oklahoma. It is a wildcat test and contract is for 10,000 ft.

Manahan Drilling Co. was moving in materials for R. H. Lynn et al 1 Adams, NE NE SE 8-15n-4e, northwest of Chandler in Lincoln County, Oklahoma.

Helmerich & Payne, Inc., Tulsa, has contract for Phillips Petroleum Co. 1 Essie, NE NE SW 27-33-3w, about 7 miles north and west of the town of Caldwell in southwestern Sumner County, Kansas. Contract calls for 5,400 ft. or to the Arbuckle. Contractor also is drilling National Associated Petroleum Co. 1 Riley, in SE NE NE 16-6-17w, north of Stockton and east of Faubion, in Rooks County, Kansas. Well was drilling around 2,731 ft. and running 157 ft. higher than a recent completion in 12-6-18w, to the west.

Harry L. Edwards Drilling Co., Houston, Tex., is moving in to drill Stewart 2 Brandes, in the North La Ward field, Jackson County, Texas. It set surface pipe last week at 4 Graves, also in North La Ward, for Cities Service Oil Co. It was at 4,200 ft. at 2 Peters, a 10,500-ft. test which it is drilling for Pan American Production Co. in the South Gillock area, between Dickinson and Texas City, Galveston County, Texas.

C. B. Miller has been awarded contract to drill Miller Brothers Co. 1 F. S. Vahue, in NE NE SE 8-2n-13w, Allegan County, Michigan.

Union Drilling & Producing Co. has contract to drill Southwest Development Co. 1 Ora Emily Hewlett, in NE NE NW 26-14n-7w, Mecosta County, Michigan.

Grey Wolf Drilling Co., Houston, Tex., is rigging up for 1 Powell Lumber Co., to be drilled for General Crude Oil Co. in the Bear field, Beauregard Parish, Louisiana. It was moving in at 1 Allen, a deep wildcat test

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for Gulf Oil Corp., in the S. McNeil Survey, Brazoria County, Texas. It was drilling at 4,000 ft. at 1 Hugo Wuensch, in the James Foster Survey, Yorktown field, De Witt County, Texas. Grey Wolf was near the contract depth, 7,200 ft., at 1 Adolph Moos, Unit 2, which it is drilling for Texas Co. in La Gloria area of Jim Wells County.

Ashby Drilling Co. will be the contractor on Ohio Oil Co. 5 Gas unit, in C SE 29-15n-11w, Newaygo County, Michigan.

Fain Drilling Co., Houston, Tex., has set surface pipe at 1,430 ft. at 1 Groves, which it is drilling for Superior Oil Co. of California in Van Zandt County, Texas. As the week closed, it was bringing in 2 Schrode, a Pettus production test for Superior in the Porter field of Karnes County. In the Willimar field, Willacy County, it was drilling at 6,927 ft. at 1 Rodriguez, an 8,500-ft. contract for Pan American Production Co. It was setting protection pipe at 9,000 ft. in a well for Stanolind Oil & Gas Co., the 1 South Texas Rice, on the Danbury dome, Brazoria County. It was testing at 1 William Cameron, a wildcat test which it is drilling for Continental Oil Co. 2 miles northeast of the Rincon field, Starr County. Fain is working on three other Continental contracts. At latest reports it was preparing to complete 9-E Slick, in the Rincon field. It was drilling at 6,465 ft. at 3-W Woods, in the Slick (Wilcox) field, Goliad County. It was drilling at 3,430 ft. at 1 Cockrell, Fayette County.

Franklin & Tideman, Ltd., Houston, Tex., have set surface pipe at 1 Olive Sherman, a wildcat test on the south flank of Moss Bluff, 3½ miles northeast of Wellsville, Chambers County, Texas, for Butcher-Arthur, Inc.

Houston Drilling Corp., Houston, Tex., last week spudded 2 Mauritz, in the North La Ward field, Jackson County, Texas, which it is to drill for Tide Water Associated Oil Co. In the same field it was at 3,000 ft. at 1 Belicek, which it is drilling for Johnston & Johnston.

Penrod Drilling Co. has the contract to drill the East Texas field's first 12,000-ft. wildcat which got under way with the spudding of Gulf Oil Corp. 1 Witt, L. Rufty Survey, which set 9⅝-in. casing at 1,500 ft. and was drilling below 1,990 ft.

Fitzpatrick Drilling Co., Corpus Christi, Tex., was below 7,600 ft. at 1 C. E. Wertz, a wildcat test which it is drilling a mile east of Raymondville, in Willacy County, Texas, for Sinclair Prairie Oil Co.

Comanche Drilling Co., Blackwell, Okla., recently completed as a dry hole, through the Bartlesville sand, at a total depth of 3,025 ft., the 1 C. R. Pickens for Charles L. Jenkins, in SE SE NE 20-34n-7e, Cowley County, Kansas. The company is now moving tools and rigging up on the Mary Duncan farm in C NE SW 15-35-2e, Cowley County, for a 3,500-ft. test for Smith-Horten Co., of Seminole, Okla.

George Miller has the contract for a cable-tool test on the southwest edge of the old Bridgeport pool in Lawrence County, Illinois. The well is being drilled by Clark C. Nye, Mount Carmel, Ill., in 3-2n-12w.

Eric Hussey, with his wife and three sons, have returned by plane from Trinidad, British West Indies, to Petrolia, Ont. Mr. Hussey resigned a post with a Trinidad oil company to assist his father, **Wm. J. Hussey,** in his work as a drilling contractor.

Illinois Issues List of Well-Spacing Patterns

SPRINGFIELD, Ill.—As a guide for Illinois oil operators in seeking drilling permits, a descriptive list of 165 well-spacing patterns has been prepared for distribution, according to Robert M. Medill, state mines and minerals director. He said that it had been prepared as the result of many requests and will be distributed among registered operators and surveyors.

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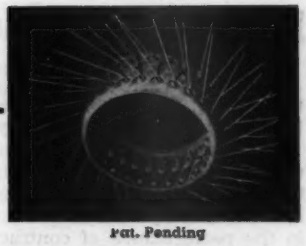

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Labor Law Applications

(Continued from Page 46)

typical applications of the Walsh-Healey Act to the oil industry.

This law sets standards of minimum wages, overtime compensation, child labor and safety and health and forbids the employment of convict labor in the performance of contracts subject to the act. The minimum wages required under the act are those which the secretary of labor has determined to be the prevailing minimum wage for persons employed in similar work or in the particular or similar industries operating in the locality. There has been no minimum-wage determination for the oil industry as such but employes engaged on government contracts generally are covered by the Fair Labor Standards Act since they are usually engaged in interstate commerce or in producing goods for interstate commerce.

Basic straight-time hours of work under the Walsh-Healey Act are 8 in any 1 day or 40 in any 1 week. Overtime is permitted, of course, if 1½ times the basic rate is paid for all hours worked in the work-week beyond 8 hours a day or 40 hours in the week, whichever is greater. For example, an employe whose total work-week consisted of four 10-hour days would be entitled to 8 hours at time and one-half under the Walsh-Healey Act. Under the Wage and Hour law, which makes the work-week its standard, he would not be entitled to such overtime since his hours of work in that week did not exceed 40. On the other hand, where an employe worked, let us say, five 10-hour days and one 5-hour day during a week, he would be entitled to 15 hours at time and one-half under either law.*

Heretofore, the Walsh-Healey Act generally prohibited the employment of boys under 16 and girls under 18 years of age. In order to facilitate the production of war materials, an exemption granted by the secretary of labor now permits the employment of girls between the ages of 16 and 18 subject to certain conditions. The conditions of the exemption provide, among other things, that these girls may not work more than 8 hours in 1 day, nor between the hours of 10 p.m. and 6 a.m., and that they may not be employed in dangerous or hazardous occupations.

*Employers who enter into certain collective bargaining agreements with their employes pursuant to provisions set forth in the Fair Labor Standards Act, may employ them up to 12 hours a day or 56 hours a week without the payment of time and a half for overtime.

Walsh-Healey is the only federal statute which fixes safety and health standards for manufacturing industries. This act requires that goods supplied on a government contract be manufactured or handled under safe and sanitary working conditions. In places where state regulations set up similar requirements, compliance with such local requirements will be taken as prima facie evidence that employers are complying with these provisions of the Walsh-Healey Act.

Since both the Wage and Hour law and the Walsh-Healey Act deal with labor standards, they have much in common. The two agencies charged with enforcing these statutes cooperated closely in the past and last fall were merged under an order of the secretary of labor. Now called the Wage and Hour and Public Contracts Divisions, the combined agencies are directed by L. Metcalfe Walling.

Both acts have certain specific exemptions which give them added flexibility. Thus Section 13(b)(2) of the Wage and Hour law exempts from its overtime requirements "any employe of an employer subject to the provisions of Part 1 of the Interstate Commerce Act." This partial exemption applies generally to employes of pipe lines transporting goods in interstate commerce and employes who are engaged in the maintenance, repair and reconstruction of such facilities. Employes of so-called "gathering" companies that operate only intrastate will not come within this exemption. Where these "local" pipe lines furnish oil to refineries that ship in interstate commerce, their employes will ordinarily be entitled to minimum wages and overtime pay as provided in the act. It should be noted, too, that employes who are exempt from the overtime requirements under Section 13(b)(2) are covered by the minimum wage provisions.

Section 13(a)(1) of the Fair Labor Standards Act, however, does exempt from both the minimum wage and overtime provisions any person employed in a bona fide executive, administrative, or professional capacity, or in the capacity of outside salesman, as these terms are defined and delimited in Title 29, Chapter 5, Code of Federal Regulations, Part 541.*

To qualify for exemption as an executive the employe's primary duty must be managerial, directing the work of other employes in the establishment; he also must regularly use discretionary powers, with the right to hire and fire or make suggestions affecting the status of other employes and he must be paid a salary of at least $30 weekly.

*Copies of these regulations are available without cost at all offices of the Wage and Hour and Public Contracts Divisions including the national office, 165 West Forty-sixth Street, New York 19, N. Y.

(Continued on Page 138)

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PERSONALS

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Young Technician Is Named Head Of Research Activities

GEORGE ROBERTS, JR., last month became one of the youngest heads of a major research organization when he was appointed to that position by Stanolind Oil & Gas Co. He is in charge of the research and development organization of that company which includes a large laboratory in Tulsa.

Born in Kentucky, Mr. Roberts graduated from University of Kentucky in 1932, receiving the degree of bachelor of science in industrial chemistry. The following year he did graduate work in chemical engineering at University of Michigan.

He joined M. W. Kellogg Co., New York City, designers and builders of refinery equipment, in 1933 and continued with that organization until he became affiliated with the Stanolind company on July 1. His work with the Kellogg company included technical service, process engineering, and chemical engineering development. He also served as cohead of the patent department.

Mr. Roberts' four young daughters are his principal hobby.

Col. Aubrey W. Schofield, recently promoted from lieutenant colonel and formerly drilling superintendent for Gulf Oil Corp., Houston, Tex., is back in the United States after extended service in North Africa, the Middle East, and India, gaining experience in desert warfare. He is to be stationed at one of the large western flying fields to supervise training of young fliers in desert combat methods. Colonel Schofield commanded the 111th Observation Squadron, Texas National Guard, Houston, when it was mobilized for training in November 1940. He was advanced to lieutenant colonel and sent overseas. While with Gulf he spent several months in Venezuelan oil fields.

Ira Heard, president of the Sheriffs Association of Texas, which met in Houston last week, pays about $7,500 a year to be sheriff of Refugio County, where he has rich oil holdings. The money isn't spent for election, but for meeting expenses of the sheriff's office, including salaries of deputies. When they struck oil on his 215 acres in the Tom O'Connor field, Refugio County, in 1934, folk supposed he would retire as peace officer, but he liked his job and he used some of his oil money to relieve the county of expense. He is credited with having paid more than $45,000 into the sheriff's office in the last 6 years.

J. C. Reeder has been appointed manager of the Los Angeles refinery of Union Oil Co., succeeding the late Ray G. Bray, who passed away in Washington, D. C., while assisting the director of refining.

James S. Noland, in charge of proration for Barnsdall Oil Co., Tulsa, and an employe of the company since the Waite Phillips' purchase in 1926, will join Phillips Petroleum Co., Bartlesville, Okla., on September 1, in the land department.

Merle M. Moore, assistant superintendent of the lubricating division at Standard Oil Co. of California's Richmond, Calif., refinery has been advanced to superintendent of the company's Bakersfield refinery, succeeding **C. A. Swigart,** who has been functioning as superintendent of the plant and general superintendent of the central district pipe-line department. Mr. Swigart will remain active in the latter capacity.

Paul M. Raigorodsky, who resigned in July as assistant director of the Natural Gas and Natural Gasoline Division of the PAW, is now at his office in Houston, Tex., and plans to divide his time between that city and Tulsa, visiting as often as possible his ranch home near Kerrville, Tex. Mr. Raigorodsky has resumed his duties as vice president and general manager of Petroleum Engineering, Inc., Houston; vice president and general manager of Glen Rose Gasoline Co., Tulsa, and manager of Claiborne Gasoline Co., Lisbon, La.

D. C. Marschner, assistant manager of the sales promotion advertising department of Shell Oil Co., Inc., has been named acting manager of that department. Mr. Marschner began work with Shell in 1929. He has been in charge of direct-mail advertising, new territory campaigns, jobber advertising programs, and merchandising surveys.

C. J. Haas, production superintendent for Sohio Corp., formerly head of western division operations with headquarters at Mount Vernon, Ill., has been transferred to Shreveport, La.

Otto M. Smith, Los Angeles, Calif., has been appointed assistant manager of the industrial relations and personnel department of Shell Oil Co., Inc., at Pacific Coast headquarters in San Francisco. His position as manager of the department at Los Angeles will be filled by **William E. Noble,** formerly assistant manager at San Francisco.

A. L. Frye, who has been associated with Richfield Oil Corp. for 5 years as a research chemist, recently resigned to become manager of the chemical division of International Cementers, Inc., with headquarters in Long Beach, Calif.

Cadet Leo C. Brown, stationed at Grand Rapids, Mich., will graduate in a few weeks from the Army Air Forces weather school. Cadet Brown was employed at the Sinclair Refining Co. at Sinco, Tex., when he entered war service last January.

First Lt. Charles P. McKnight, in an engineer regiment, somewhere in England, dropped a postcard to his former neighbor, **Morris Frank,** in Houston, Tex., slyly assuring him, "Wish you were here." Lieutenant

McKnight was chief field engineer for Houston Oil Co. of Texas when he joined the Army last November.

Charles C. Tedford, Jr., assistant engineer in the Baytown, Tex., refinery of Humble Oil & Refining Co. when he volunteered for service in the Army Air Forces, last May, is taking a special cadet training course at A. & M. College, Stillwater, Okla.

F. E. Richardson, manager of Pan American Pipe Iine Co. and assistant manager of Pan American Production Co. and Pan American Gas Co., Houston, Tex., has returned to his duties after a leave of absence of about 5 months during which he was engaged chiefly in construction of stations on the new 20-in. oil-products line which parallels the big-inch line from the Gulf Coast to the East.

Leroy H. Hines and **Hartwell H. Kuester** have been appointed assistant managers of the land and lease division of the producing department of the Standard Oil Co. of California, according to **E. G. Lawson,** general manager of exploration. Mr. Hines entered the company's employ in 1935 as a leaser in the land and lease division. He was lease specialist on government land matters before his present appointment. Mr. Kuester began working for Standard of California while a student at college, and later entered the producing department. He served successively as chief clerk, leaser and senior leaser. His current assignment includes leasing activities in connection with Standard of California exploration projects.

Hymm E. Buc, a native of Russia, last week terminated 23 years' service as an organic research chemist on the staff of the Standard Oil Development Co., affiliate of Standard Oil Co. (New Jersey). During his career with the Standard companies he was issued 56 patents and has 64 applications still pending. He was the discoverer of a mosquito repellent now widely used by the United States armed forces.

Ensign Milner L. Reed, exploitation engineer at Lake Charles, La., for Shell Oil Co., Inc., until he entered war service, received a letter of special commendation from **Rear Adm. J. R. Beardall,** superintendent of the U. S. Naval Academy, for having "exhibited to an outstanding degree officerlike qualities and positive naval character" throughout his period of midshipman training. Previously he had been made commander of C Company, honor company of his class. He remains at Annapolis, Md., as instructor in the Naval Reserve Midshipmen's School.

H. W. Parmelee of Del Valle Gasoline Co. operating in the Del Valle field has been elected a director of the California Natural Gasoline Association.

Earl B. Noble, chief geologist of Union Oil Co., has returned to his office in Los Angeles, Calif., following a business trip to South America.

T. H. (Bo) Williams has been named to succeed **B. C. Davis** as deputy supervisor of the Oil and Gas Division of the Texas Railroad Commission in District 7-C, at San Angelo.

O. P. Burnham, of Altus, Okla., has been named president of the Southwest Oklahoma Oil Producers Association which was formed in Altus when producers convened for the purpose of organizing the first association of its kind in the section. **R. O. Ray,** of Frederick, was elected vice president, and **Blair Thorpe,** of Altus, was named secretary-treasurer.

Ernie Rogers, with Stanolind Oil & Gas Co. at Shawnee, Okla., is being transferred to Tulsa to handle scout reports for the eight midwestern states. **Robert Mitchell,** geological scout with Stanolind, is being transferred to Kentucky. **Elmo Kelly** and **Billy R. Moses** will replace them at Shawnee.

Maj. Albert Clinkscales, former geologist of Oklahoma City, Okla., has been transferred to the school of military government at Charlottsville, Va., for special training. He is learning to speak the Italian language.

Dwight A. Moore, controller of the Wilshire Oil Co., Inc., has been elected a director of the Los Angeles control of the Controllers Institute of America.

Frank Gardner, formerly oil editor of the Midland Reporter, Midland, Tex., has joined the West Texas scouting department of Sinclair Prairie Oil Co. at Midland.

J. Roby Penn, president of Texas Pacific Coal & Oil Co., Fort Worth, Tex., and Mrs. Penn spent a week at the St. Anthony Hotel, San Antonio, Tex. They were joined by their son and daughter-in-law, Lt. and Mrs. J. Roby Penn, Jr., over the week end. Lieutenant Penn is stationed at Fort Clark, Brackettville, Tex.

Ensign W. K. Smith, exploitation engineer at Lake Charles, La., for Shell Oil Co., Inc., is now attending the diesel-engine school at Cornell University, Ithaca, N. Y. After receiving his commission at Notre Dame University last March, Ensign Smith was on temporary duty at the Great Lakes, Illinois, naval station for anti-aircraft training.

D. P. STURGES

D. P. Sturges, on leave of absence from Cities Service Oil Co., has been named director of the construction division of District 3, PAW, according to announcement of **D. E. Buchanan,** director in charge. This is a newly created division. Mr. Sturges, whose office will be in Houston, Tex., has been with Cities Service 20 years, in the construction and operation of refineries. His last position before accepting the PAW appointment was that of superintendent of the company's refinery in Linden, N. J.

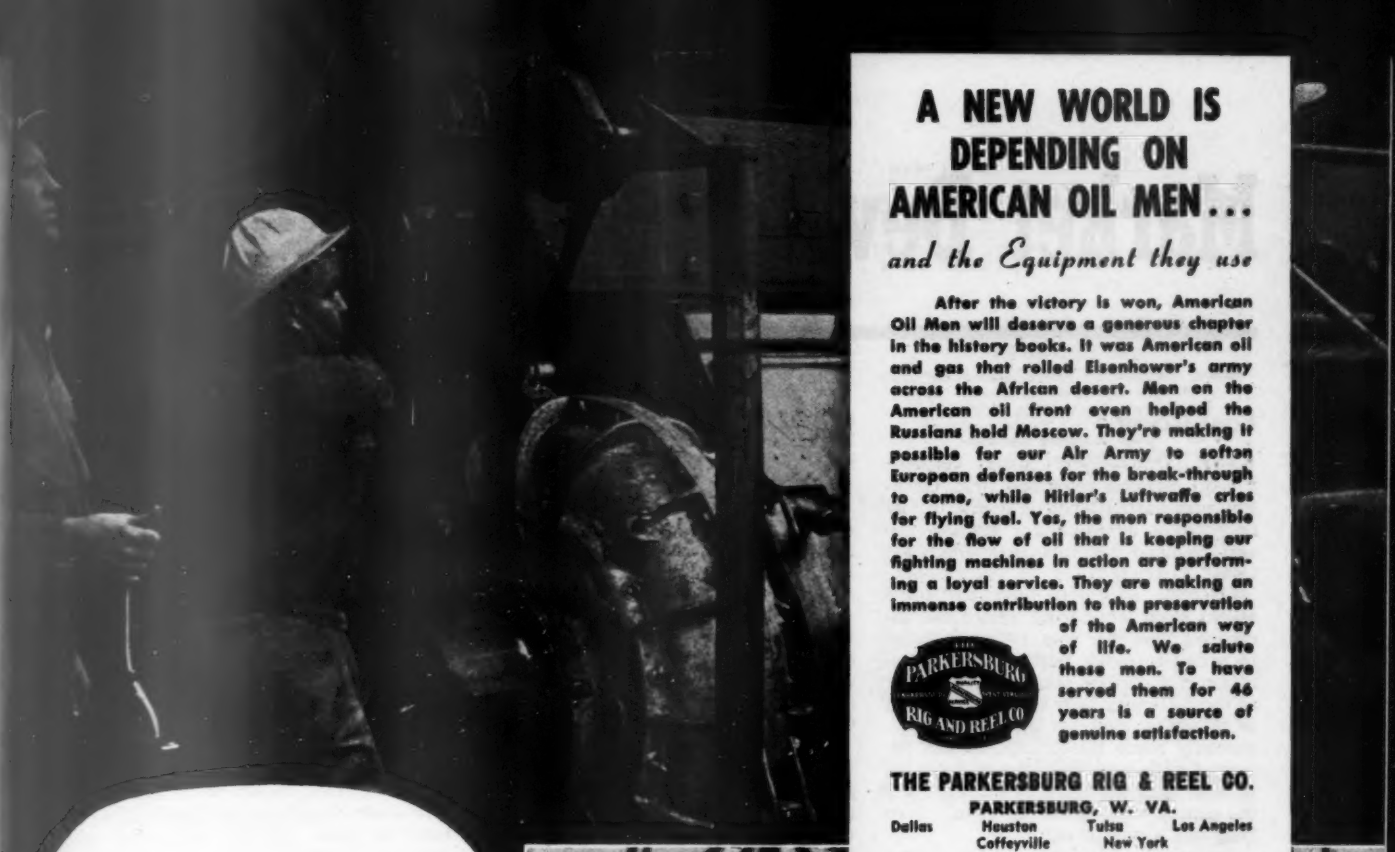
Harold E. Voigt, formerly geologist with Phillips Petroleum Co. in Houston, Tex., has joined the geological staff of Superior Oil Co. in Houston.

Charles Roop has been appointed geologist in charge of a district office Tide Water Associated Oil Co. has opened in Wichita, Kans.

Lt. Hubert S. Harvey, former geophysical computer for Humble Oil & Refining Co., Houston, Tex., has graduated from a special officers' training course at the chemical warfare school, Edgewood arsenal, Maryland. Lieutenant Harvey attended the University of Texas.

Gordon Hanson, president of the Houston (Tex.) Engineers Club, and **S. W. Oberg** and **L. A. Godbold,** members, have been named to represent the club on the engineers subcommittee of the recently organized Harris County Water Supply Committee.

Shifts: **J. M. Varner,** superintendent, Helmerich & Payne, Breckenridge, Tex., to Harlow, Okla.; **G. C. Roberts,** geologist, Amerada Petroleum Corp., Corpus Christi to Midland, Tex.; **Robert H. Tennant,** engineer, Skelly Oil Co., Midland, Tex., to Portage, Wis.; **A. R. Coleman,** superintendent, Helmerich & Payne, Odessa, Tex., to Hays, Kans.; **Earl W. Jones,** engineer, Gulf Oil Corp., Penwell to Goldsmith, Tex.; **A. B. Cramer,** engineer, Magnolia Pipe Line Co., Sundown to Stanton, Tex.; **V. C. Scott,** geologist, Texas Co., Mattoon, Ill., to Tulsa; **R. W. Hirsch,** engineer, Shell Oil Co., Inc., Perry, Okla., to Tulsa; **C. R. McCullough,** engineer, Phillips Petroleum Co., Borger, Tex., to Okmulgee, Okla.; **J. Earl Gray** engineer, Shell Oil Co., Inc., Wichita Falls, Tex., to McPherson, Kans.



A NEW WORLD IS DEPENDING ON AMERICAN OIL MEN...

and the Equipment they use

After the victory is won, American Oil Men will deserve a generous chapter in the history books. It was American oil and gas that rolled Eisenhower's army across the African desert. Men on the American oil front even helped the Russians hold Moscow. They're making it possible for our Air Army to soften European defenses for the break-through to come, while Hitler's Luftwaffe cries for flying fuel. Yes, the men responsible for the flow of oil that is keeping our fighting machines in action are performing a loyal service. They are making an immense contribution to the preservation of the American way of life. We salute these men. To have served them for 46 years is a source of genuine satisfaction.

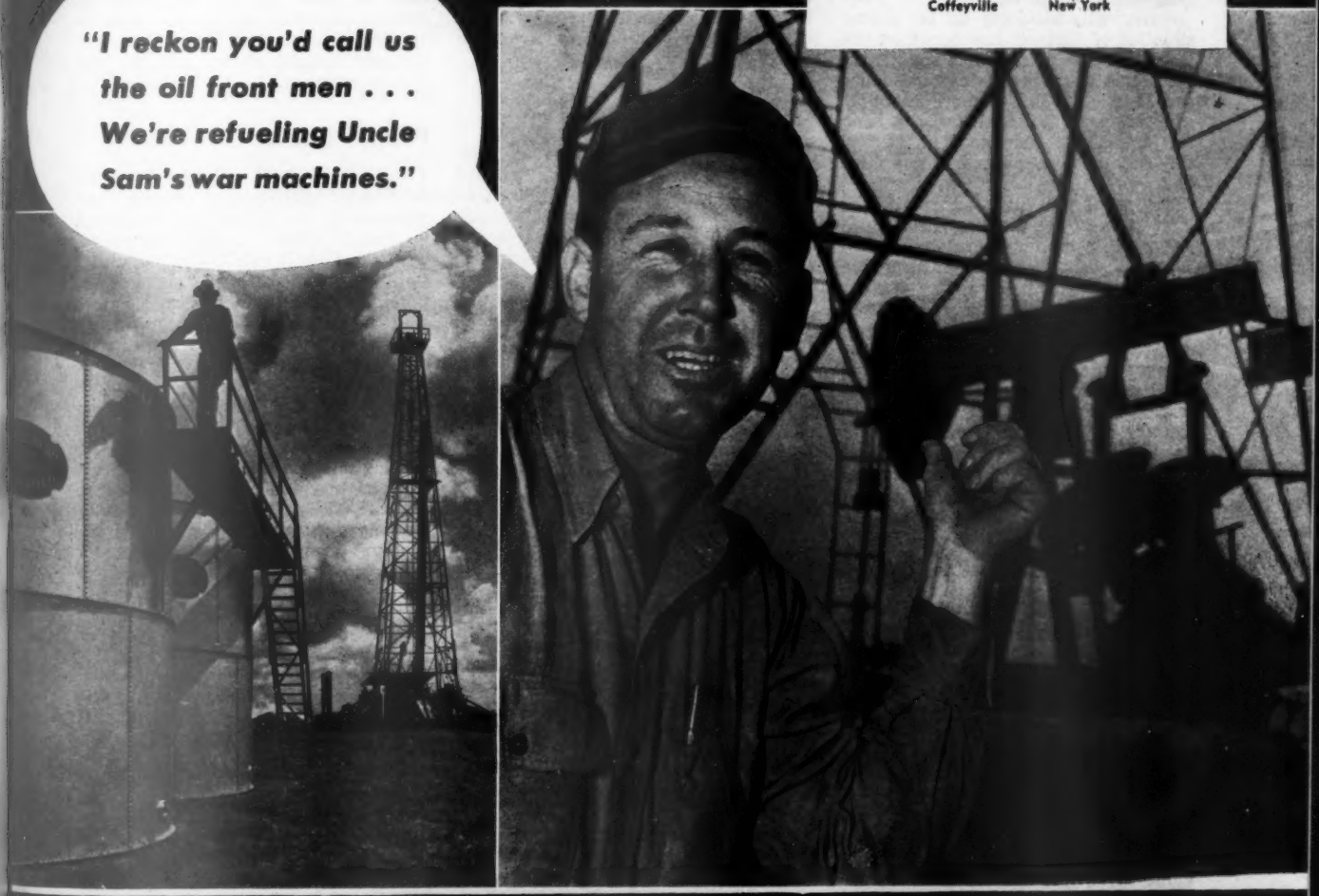
PARKERSBURG RIG AND REEL CO.

THE PARKERSBURG RIG & REEL CO.

PARKERSBURG, W. VA.

Dallas Houston Tulsa Los Angeles
Coffeyville New York

"I reckon you'd call us the oil front men . . . We're refueling Uncle Sam's war machines."



PARKERSBURG

Market Developments

East Coast

NEW YORK.—East Coast refined-oil markets remained firm. Gasoline was particularly tight due to low inventories available for civilian use and reduced receipts into the East Coast district.

Gasoline suppliers have for some weeks been wondering where the increased gasoline was to come from in order to make possible additional rations for civilian consumers, in view of the difficulty they had been having in obtaining supplies themselves. Apparently some misconception has occurred with respect to the outlook for federal officials have been reporting the supply outlook less favorable than they did a month ago.

Apparently stocking up on winter supplies of fuel oil has occupied the bulk of the shipping space for oil into the Atlantic seaboard territory since the 24-in. pipe line became available as well as additional tankers, and this trend may hold good at least to the end of September, oil suppliers believe.

Prices of all oil products in the East seem to be holding firm. Suppliers are watching developments in the crude-oil price situation for a clue as to prospects for any further changes in prices for refined products.

One oil man went so far as to predict a tight situation in the gasoline market in the Atlantic coastal area until next spring, when the 20-in. products line from Texas to New York has been completed. Until then tank cars will be depended upon to move products, with the pipe lines concentrating on crude, according to the understanding in oil circles here.

Mid-Continent

MANY Mid-Continent refiners over the past week have endeavored to devise means to do their part in increasing gasoline shipments from District 2 to District 1. The Supplies Division of PAW for District 2 has asked individual refiners to increase shipments so that the entire district will be shipping 50,000 bbl. daily of additional gasoline to District 1. This is in line with the Government's program of making more gasoline available in District 1 by reducing the value of A, B and C coupons 25 per cent in Districts 2 and 3, a decrease which became effective August 16.

It is apparent that many refiners will not be able to comply with this request immediately as they are still behind in their shipments to regular customers in District 2. This is particularly true in the farming areas where the gasoline demands have reached peak proportions and where some of the smaller refiners, starting last month, were compelled to reduce deliveries to regular customers because they did not have sufficient storage on which to draw in order to meet these summer requirements. Additional supplies of crude oil to increase gasoline output in the Mid-Continent are not available.

In regard to prices the ceiling quotation of 6 cents for 72-74 regular-grade gasoline is well established with plenty of refiner and jobber buyers at that figure. The 63-66 grade is firm at 5⅝ cents with the third grade of 60 octane or less not available under 5¼ cents.

Gulf Coast

HOUSTON, Tex.—Intensification of efforts to meet the rising demand for oil products needed in prosecution of the war continued this week to tighten a refinery market which has become the despair of buyers. Completion of plants designed to produce 100-octane gasoline for war use will hasten as the result of organization of a construction committee composed of representatives of all companies building such plants. A major duty of the committee will be to see that all material available for this construction work is allocated to the points where it can be used to the best advantage and thus reduce the number of bottlenecks.

Although inventories of Bunker C fuel oil continue to increase a little, they had fallen to such an unprecedentedly low level that the additions in the last few weeks are of small significance. Some buyers of this material report they actually are experiencing more difficulty than before. Major refiners have not been able to produce enough Bunker C to meet demands upon them, and they have been large purchasers from the small refiners. In recent weeks there is said to have been an increase in the practice of blending lighter fractions with the Bunker C. The higher-gravity fuel oil thus produced is readily salable at a higher price, and it is said to take an appreciable volume of Bunker C out of the market.

Urgent appeals for No. 2 fuel oil from the East Coast were reported this week. Supplies were increasingly hard to find. Buyers said that by diligent combing they were able to uncover an occasional car of kerosene, but that the search for gasoline was almost hopeless.

Pacific Coast

LOS ANGELES, Calif.—For the fourth consecutive month the number of service stations operating in Pacific Coast territory increased with the largest gain being shown by California. A total of 197 service stations resumed business but 11 more shut down in Oregon which means the net gain was 186 for the district during the month of July.

California spot markets were generally quiet and there is nothing to indicate any improvement in the near future. Third structure gasoline is passing out of the picture and within a short time will be the exception to the rule. The more progressive service stations now carry two first grade gasoline pumps and one pump for Ethyl in a three-pump island or double the number if the station has two dispensing islands. It has been several months since any low octane gasoline has changed hands and indications point to the probability that nothing below 65 octane will move in the normal market. Fuel oil demand continues and can be expected to show a further gain but for the present marketers are content to reduce inventories before stepping out into the market to make additional commitments. Gas oil is in excellent demand but there is very little available and consequently no sales have been recorded for several weeks. Natural gasoline is tight with practically all available supplies tied up under time contract.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended August 14, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	140	1,993	512	994
Ind., Ill., Ky.	723	14,445	3,267	5,871
Okla., Kan., Mo.	335	5,995	1,688	2,053
Censored area*	1,953	29,679	14,740	15,153
Rockies	98	1,480	683	369
California	745	18,934	45,558	12,134
Total 8-14-43	4,004	72,505	66,448	36,574
Total 8- 7-43	3,776	73,368	66,714	36,344
Total 8-14-42	3,574	79,559	78.316	39,372

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
August 14, 1943	236,520,000
August 7, 1943	237,302,000
August 15, 1942	248,433,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of August 24)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	6.000	.....	5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	5.00-5.50	.....	$5.750-6.250	$5.750-6.250	$5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6	6.000-6.125	5.500-6.000	(No...

*Basis Group 3. †1939 C.F.R. (research method). ‡Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3

TRACTOR, DIESEL AND BUNKER FUEL OIL

Specifications:	48-48° G.	34 D.I.	48-52 D.I.	56 & above	Diesel bunkers	Residual Bunker C‖
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	3.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. ‖Gravity range

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‖1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300 ‖Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-68
Oklahoma (Group 3)	3.875	4.600
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
500	15.50	16.50
300 flash	16.00	17.50
150 flash	17.00	17.50

Neutral Oil

vis at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:

300-S	15.00
250-S	18.00
200-S	19.50
150-S	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—

Pale oils:

200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Red oils:

200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:

200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00

200 vis. at 70° F., 3 color:

Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	33.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

NEW YORK—

Wax in bags fully refined

120-122 (A.m.p.) wax	4.250
123-125 (A.m.p.) wax	4.125

Crude scale:

124-126 (A.m.p.) w.s	4.250
124-126 (A.m.p.) y.s	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Baltimore, Md.	15.90	5.50	10.25
Boston, Mass.	14.90	4.00	10.10
Burlington, Vt.	16.90	5.50	10.50
Buffalo, N. Y.	16.20	5.50	10.50
Dover, Del.	16.70	5.50	12.50
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.00
Pittsburgh, Pa.	16.70	5.50	12.20
Portland, Me.	16.30	5.50	10.30
Providence, R. I.	15.00	4.50	9.00
Washington, D. C.	15.20	4.50	11.20
Average 14 cities	16.03	5.14	10.80

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Chicago, Ill.	13.40	4.50	10.6
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.1
Detroit, Mich.	14.40	4.50	10.0
Fargo, N. D.	16.90	5.50	11.0
Huron, S. D.	16.30	5.50	11.0
Indianapolis, Ind.	15.20	5.50	10.1
Little Rock, Ark.	17.50	6.00	10.00
Milwaukee, Wis	16.10	5.50	10.5
Minneapolis, Minn.	15.9	5.50	10.5
Omaha, Neb.	15.40	6.50	9.00
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.3
Average 14 cities	15.19	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag
Atlanta, Ga.	18.90	7.50	*11.00
Birmingham, Ala.	18.80	8.80	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	12.50
Charlotte, N. C.	20.10	7.50	11.50
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.00
Memphis, Tenn.	17.90	8.00	10.00
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.50
Average 11 cities	18.34	7.80	10.45

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag
Albuquerque, N. M.	17.50	7.00	10.50
Boise, Idaho	20.10	6.50	10.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	12.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	12.50
Salt Lake, Utah	18.50	6.50	14.00
Average 8 cities	17.38	6.25	12.00

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag
Portland, Ore.	17.00	6.50	12.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.00
Average 3 cities	16.17	5.83	12.33
Average 50 cities	16.56	5.96	10.97

Labor Law Applications

(Continued from Page 132)

The requirements for exemption as an administrative employe include a monthly salary of at least $200. In addition, such an employe's duties must involve regular and direct nonmanual assistance to a "bona fide executive or administrative" employe and require the exercise of discretion and independent judgment; or he must perform under only general supervision responsible nonmanual work of a specialized or technical nature, related to management policies or general business operations, and requiring the exercise of discretion and independent judgment; or his work must involve the execution under only general supervision of special nonmanual tasks directly related to management policies or general business operations and involving the exercise of discretion and independent judgment.

The salary test for professional employes is $200 monthly.* The nature of the work they perform must coincide with the duties given in the regulations. Professional employes must also have special qualifications. In general, this requires knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized instruction or study. Engineers and chemists with the appropriate academic degree would be apt to qualify for exemption under Section 13(a)(1).

Employes who are exempt under this section also are exempt from the Walsh-Healey Act. In general, the latter act does not apply to office and supervisory employes, to custodial employes or to certain maintenance workers.

The terms "custodial" and "maintenance" refer to employes whose duties are directed to the upkeep of the plant and who do no work on the commodities furnished the government. Firemen engaged in producing heat and power for plant operation, telephone operators, janitors and watchmen usually would fall into this exempt category. However, these employes would be covered under the Wage and Hour law.

Both acts require covered employers to keep accurate time and pay-roll records which must include: Employe's name, address, occupation (and age in the case of minors); hours worked, rate of pay, overtime compensation, and the like. Special forms are not required, but the necessary information must be complete and readily available.

Compliance is good insurance, but that is not all. Because industrial progress is a matter of men and machines decent labor standards help maintain high production. The oil industry itself is a good example of the fact that progress is swifter where pay rolls and profits keep step.

*There is no salary requirement for qualified lawyers and physicians who are engaged in the practice of law or medicine.

LEGAL

U.S. DEPARTMENT OF THE INTERIOR, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the Boone Dome gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226), at a sale to be held in the district land office at Cheyenne, Wyoming, at 10 o'clock a.m. on September 30, 1943, of the following parcels: Parcel No. 1, T. 35 N., R. 85 W., sec. 9, NE¼NE¼, N½NW¼, SE¼ NW¼, E½SW¼, W½SE¼, SE¼SE¼; sec. 10, SW¼NW¼, NW¼SE¼, SE¼SE¼; Parcel No. 2, T. 35 N., R. 85 W., sec. 14, W½NW¼, SW¼; sec. 15, E½NE¼, N½SW¼, SE¼SW¼, S½SE¼. Each successful bidder must deposit on the date of the sale a certified check or cash for one-fifth of the amount bid by him, and file a showing of qualifications to receive the lease as required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. In the event one bidder is awarded both parcels, a collective bond in sufficient amount may be furnished to cover the two leases he obtains. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid, and a showing of qualifications of the bidder. The envelopes should be plainly marked for opening on the day and hour of the sale. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. William G. Johnson, Register.

$1.30 for Egan Crude

Effective August 16, Sun Oil Co. posted a price of $1.30 per barrel for crude oil of 40° and over, from the Egan field, Acadia Parish, Louisiana.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the N½NW¼ sec. 14, T. 26 N., R. 90 W., 6th P.M., 80 acres, Lost Soldier oil and gas field, Wyoming, is offered to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226) at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on September 30, 1943. The land will be offered in a single unit. The successful bidder must deposit on the date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid and the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.30
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.27
Pecos County, Texas	.80
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.00

*No change since 8-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the Buffalo Basin gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226), at a sale to be held in the district land office at Cheyenne, Wyoming, at 10 a.m. on September 9, 1943, of the following parcels: Parcel No. 1, T. 47 N., R. 99 W., sec. 7, SW¼ NE¼, W½SE¼; sec. 18, W½E½, E½SW¼; Parcel No. 2, T. 47 N., R. 99 W., sec. 19, lots 1, 2, W½NE¼, E½NW¼, T. 47 N., R. 100 W., sec. 24, E½NE¼, NW¼NE¼; Parcel No. 3, T. 47 N., R. 100 W., sec. 11, NE¼NW¼, E½SE¼, sec. 13, SW¼NW¼; Parcel No. 4, T. 48 N., R. 100 W., sec. 36, E½SW¼, sec. 27, NW¼NE¼, sec. 28, NE¼ NE¼; Parcel No. 5, T. 48 N., R. 100 W., sec. 35, lots 1, 2, NW¼NE¼; Parcel No. 6, T. 48 N., R. 99 W., sec. 31, lot 4, T. 48 N., R. 100 W., sec. 36, lot 7. Each successful bidder must deposit on the date of sale, with the officer in charge of the sale, a certified check on a solvent bank or cash for one-fifth of the amount bid by him, and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. The successful bidder of two or more parcels may consolidate them in a single lease if the total acreage does not exceed 640 acres, and may file a satisfactory collective bond. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid, and a showing of qualifications of the bidder. The envelope should be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

Equipment Progress

Direct-Fired Air Heaters For Dehydration and Chemical Processes

Output temperatures between 150° F. and 350° F., with the heated air free from contamination can now be obtained from coal or oil-burning direct-fired heaters without the use of critical alloy steels, by a method recently developed by Dravo Corp., 300 Penn Ave, Pittsburgh, Pa.

These high temperatures are obtained from heaters with carbon-steel combustion chambers, by means of a recirculating device. The recirculating principle allows heated air to be fed back to the heater's intake, so that the normal temperature rise obtainable by wiping air around a carbon-steel fire box will produce any temperature up to 350° F., according to the percentage of the air that is recirculated. This percentage is regulated by a damper in the recirculating duct. To produce 350° F., 80 per cent recirculation is required.

The air-temperature demands in the majority of dehydrating and chemical processes fall between 150° F. and 350° F. The lower range can easily be met with the standard type of Dravo heater in general use for space heating. But for the range up to 350° F., modifications are required.

Saving of fuel as a result of high efficiency of heat abstraction and negligible radiation losses; quickness of installation; availability for quick shipment; flexibility of the installation as regards later plant extension; and the fact that skilled labor is not required for their operation—are important factors to be considered now. Such heaters are available for oil, gas, or coal as fuel, and heaters designed for coal can be converted to oil or gas when conditions make these fuels available after the war.

Dehydro Back on Production

In spite of the recent fire at the Dehydro plant, located at Hale Station, Tulsa, Harry S. Horton, sales manager for Dehydro, Inc., announced "that Dehydro petroleum-treating compounds are being made and delivered on schedule and that no customers have been inconvenienced because of the fire." He also stated that only through the excellent cooperation and service rendered the company by the various public utilities and suppliers of materials was it possible to go through such a fire and be back on production in a week's time. Also upon inventorying the materials it was found that no loss in raw materials had been suffered. The plant is rapidly being reconstructed, and when completed will contain the most modern processing equipment, to better service the oil industry.

Sullivan Wins Army-Navy Award

The Army-Navy "E" award for production excellence was made to the employes of Sullivan Machinery Co., Michigan City, Ind., plant, in an impressive ceremony.

Rear Admiral H. G. Taylor, U.S.N., presented the "E" flag to F. W. Copeland, Sullivan president. Col. Martin H. Ray, U.S.A., presented token pins to veteran employes of the company. Arthur S. Knoizen, director, Mining Equipment Division of the War Production Board, spoke briefly about the remarkable production record established by the Sullivan employes. Nearly 1,500 persons attended the ceremony, which was held in a beautiful woodland setting on the plant grounds.

Waller Texas Sales Manager Of National Supply Co.

R. L. Waller has been appointed division sales manager for Texas by National Supply Co. Mr. Waller served various assignments with the company in Shreveport, La., before his transfer to Fort Worth, Tex., 2 years ago. His headquarters will be in Forth Worth.

AIR REDUCTION COMPANY GETS "M" AWARD

In recognition of conspicuous and outstanding production achievement, Adm. Emory S. Land, chairman, presented the U. S. Maritime Commission "M" award to Air Reduction Co., Inc., in a colorful ceremony at Bethlehem, Pa., July 17. Photo shows: Admiral Land; Walter J. Strawn, oxygen plant worker representing the employes; C. S. Munson, president, and C. E. Adams, chairman of Air Reduction Co., Inc.

Among Equipment Men

Zwerneman Leaves Axelson For PAW Post

Announcement has just been made by J. G. Axelson, president of Axelson Manufacturing Co., that Alvin "Dutch" Zwerneman, vice president and associated with the Axelson organization for the past 20 years, has severed his company association to become associated with the PAW under Frank A. Watts, director of material. Mr. Zwerneman's title is special assistant to the director of material and he will represent the petroleum equipment manufacturers and suppliers. His appointment is the result of a special meeting of the Petroleum Equipment Dealers' Association held in Dallas, Tex., April 23, 1943. At that time a resolution was adopted to recommend to PAW that a special section be created in the Office of Director of Material to deal with the needs and problems of petroleum equipment manufacturers and suppliers. Mr. Zwerneman's place has been taken by Ken S. Ramey, who will act as temporary California sales manager. Mr. Ramey has been with Axelson over 20 years. He will headquarter at Los Angeles.

Alvin Zwerneman and J. C. Axelson, president of Axelson Manufacturing Co.

New Company Organized In Houston, Tex.

Wallace D. Wilson, president of Wilson Supply Co., 1412 Maury St., Houston, Tex., has announced the formation of Wilson Foundry & Machine Co., a corporation with the following officers: Wallace D. Wilson, president; T. W. Wilson, vice president; R. W. Jeffrey, secretary-treasurer. The new corporation has purchased the properties, including machine shop and foundry, of J. D. Nixon Co., Elysian Street, Houston.

Wilson Foundry & Machine Co. will manufacture the patented Nixon surface control gas-lift system and other oil-field specialties which were produced under the former ownership. Sales of all their products will be handled by Wilson Supply Co.

W. J. Sutton, petroleum engineer, for the past several years in charge of petroleum engineering department and director of gas-lift sales for Wilson Supply Co., has been placed in charge of the new company. He will retain his position with Wilson Supply Co., in addition to his new duties.

J. D. Nixon, former owner of the shop and foundry, has opened offices in the M. & M. Building, Houston. He and his staff of engineers will continue research and development in the field of gas lifting for the new company.

Robison Resigns Caterpillar Vice Presidency; Spain Appointed Successor

D. A. Robison has resigned as vice president of Caterpillar Tractor Co., Peoria, Ill., to become the company's distributor at Salt Lake City, Utah, and Gail E. Spain, who was made a vice president in May 1942, will succeed him as administrative vice president of the advertising, sales, export, engine sales, special products and war contracts departments, according to an announcement by L. B. Neumiller, president of Caterpillar.

H. D. Landes, who has represented Caterpillar in the Utah and southern Idaho territory for 20 years, is giving up most of his business interests but will continue to devote considerable of his time and attention to recently acquired cattle interests. The formal transfer of the distributorship will occur some months hence.

Mr. Robison became associated with Caterpillar, starting in the shipping room of the parts department at San Leandro, Calif., in 1926. He advanced rapidly through various positions in the credit and treasury department to the office of assistant treasurer, treasurer and then general sales manager. He was promoted to vice president in 1940.

Mr. Spain, who has been in charge of operations at San Leandro since his elevation to vice president, is returning to Peoria to assume his new responsibilities. He joined Caterpillar in 1929 as logging representative. Succeeding administrative positions in the merchandise, engine and engine sales departments and in the sales development division culminated in his appointment as general sales manager in 1940, followed by a vice presidency last year.

METER COMPANY EXECUTIVES SERVE COUNTRY

W. F. ROCKWELL *W. F. ROCKWELL, JR.* *A. E. HIGGINS* *ALLEN D. MacLEAN*

Four of the top executives of Pittsburgh Equitable Meter Co., Pittsburgh, Pa., are now active participants in various branches of governmental service.

Col. Willard F. Rockwell, president, who has been in the Army Reserve over 20 years, has been serving as director of production for U. S. Maritime Commission in Washington, D. C., since April 7, 1942. He was appointed to this post on the recommendation of General Knudsen and at the request of Adm. Emory S. Land, chairman of the commission. In this capacity, he is in charge of the production requirements for cargo vessels ordered by the commission and must see that schedules are maintained. He is a member of the executive committee of the Army and Navy Munitions Board, the material requirements committee and scheduling committee of WPB, as well as serving on numerous other committees.

Allen D. MacLean, vice president and chief engineer, is also in Washington with the Maritime Commission, serving as assistant director of production.

Pvt. W. F. Rockwell, Jr., vice president and comptroller, is in training at the Army Ordnance Officers' School, Aberdeen Proving Grounds, Aberdeen, Md.

Capt. A. E. Higgins, vice president and sales manager, a reserve officer of many years standing, was on May 8 commissioned major and assigned to active duty with the U. S. Air Corps.

Classified Advertising

EQUIPMENT FOR SALE

FOR SALE: Pressure Storage Tanks, total capacity, 5,766 barrels, sizes 10' x 40' down to 4' x 10'; also miscellaneous engines, compressors, valves and fittings. Arab Gasoline Corp., P. O. Box 709, Eastland, Texas.

FOR SALE—1—14 x 12 Gardner-Denver Twin Cylinder-Piston Valve Type Roller bearing complete enclosed oil bath—steam engine mounted on 12 x 12 H Beam steel skids with necessary cross members and braces 20 feet long with National steam separator and trap-force feed oil pump and 6" Badgett steam lubricator for dual oil system—3" Brown throttle valve—22 tooth dual drive split sprocket for 1240 double chain. All the above mounted in unit and completely piped and fitted for steam connection.

2—12 x 12 Oil Well Supply Twin Cylinder Steam Engines mounted—fitted and equipped as above—Approximate HP 750.

None of these engines need overhauling or repairs. They are ready to go.

1—OWS 9 x 9 x 9 Drawworks unit with hydromatic brake, double engine drive water cooled drum complete with guards and chains.

1—400 ton 8" Ideco swivel complete w/gooseneck and left hand bottom connections.

Other drilling equipment, also 3½ and 4½ O.D. Drill Pipe for sale. F. H. BROWN P. O. Box 331, Carmi, Illinois.

FOR SALE: Oil refinery equipment including high and low pressure valves, gages, also two new Caterpillar D-2 tractors equipped with La Plant Choate hydraulic Dozers. List of items sent to interested buyers on request. HARVEY BROTHERS, Parkdale, Colorado.

FOR SALE: Approximately 40,000 ft. of used 7" O.D. 24# plain end line pipe. Available for immediate shipment from Oklahoma points. Central Supply Co., 109 N. Elgin, Tulsa, Okla.

1—500 HP Terry condensing turbine—1750 RPM.
1—700 HP Terry condensing turbine—2900 RPM.
1—100 HP Superior twin gas engine compressor.
1—22/13 x 14 Sullivan angle 2 stage 1250' Compressor with 250 HP motor. Rebuilt. $7,000, on cars.
2—I. Rand type XPVR 1800 ft. compressors, steam driven.
4—4" Pacific 10 stage centrifugals—500 GPM-750#.
1—600" x 34' Southwestern flash column.
1—750 sq. ft. Southwestern condenser, steel shell, admiralty tubes.
1—670 sq. ft. Braun 6 pass, 250# atmospheric section.
1—40 sq. ft. G. Rusell shell and tube condenser, 800# WP.
2—14 x 12 I.R. cylinders XRB.
2—14 x 14 I.R. cylinders XRB.

DAVE WEST COMPANY
2301 East 37th St., Los Angeles, Calif.

UNITIZED Gasoline Powered Outfit—capacity 3500 ft., 2 strings drill pipe 3½ to 2⅞" near Holton, Kansas. $10,500 cash. Further information write owner M. J. Lewis, 1201 Bennett, Long Beach 4, Calif.

FOR SALE

One Watts-Miller Improved 50 HP Air Compressor, first-class condition. Ideal setup for repressuring partially depleted sands.

H. S. MOSS
1503 First Nat'l Bank Bldg
Dallas 1, Texas

DIESEL ENGINES

Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—also boilers, steam engines, turbo generators.

Complete Information on Request

A. G. SCHOONMAKER COMPANY
45 Church Street New York, N. Y.
Phone—WOrth 2-0455

EQUIPMENT FOR SALE

FOR SALE: One Crude Oil Fractionator Tower 5'0" x 74'0"—4000 barrels per day capacity. ARROW PETROLEUM CO., 7419 Franklin St., Forest Park, Illinois.

FOR SALE: Complete Rotary Unitized powered rig with 2 Le Roi—125 HP Engines, Oil Well 5⅞" x 12" geared pump, will make 4,000 ft. hole. Have Steel Tool House with all tools, no pipe, in first class condition. Reasonable. A. A. Gilbert Pipe & Supply Co., P.O. Box 986, Shreveport, La.

FOR SALE: 2 Le Roi 125 HP Engines, newly overhauled, complete, reasonable. A. A. Gilbert Pipe & Supply Co., Box 986, Shreveport, La.

FOR SALE: One Joplin Special Keystone drilling rig. Size 5½. Good line of tools, good wire lines. Price reasonable. Willis Ramsey, 203 North Lewis St., Glasgow, Kentucky. Phone 88X.

CASING
15,000 feet 6⅝" 22 lb. No. 1 lapweld casing.
LINE PIPE
20,000 feet 3" T & C Standard line pipe, No. 1.
Located Yale, Oklahoma

BENDER SUPPLY COMPANY
1205 Marshall Street, Shreveport, La.

EQUIPMENT WANTED

WANTED

Used storage tanks:
Pressure Tanks:
All sizes
Send us your list

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

WANTED

1—7" Cameron 6000# Test, Pressure Operated, Flow Line Valve.
1—10¾" Cameron 6000# Test, Pressure Operated, Master Valve.
1—7" Cameron 6000# Test, Pressure Operated, Blowout Preventer.

We are interested in new and used equipment. Do not offer used equipment unless in perfect operating condition. Quote condition and price. Danciger Oil and Refining Co., Fort Worth, Texas, LD 142, G. B Magruder, Jr.

WANTED

Used Structural Steel
Pipe — Valves
Fittings
Send us your list

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

LEASES AND DRILLING BLOCKS

WILL pay cash wells shallow production or wells to be salvaged. Will also lease. Give production, location, etc. Box B-745, The Oil and Gas Journal, Tulsa, Okla.

FOR Drilling Blocks, and leases, and royalties in Wood, Franklin and Hopkins counties, Texas—see

W. B. WORTHEN
P. O. Box 84 Winnsboro, Texas
Phone 228

NEW 89-acre lease, ¾ mile from production, Shelby County, Texas, two other wells to start soon. $3.50 per acre. Excellent buy! Four Thousand acre drilling block on good structure. Write C. A. Parker, Box 451, Center, Texas, for information.

HAVE 10,000 acre block in western Canada wildcat acreage, good geology, 3,500' maximum depth. Wish to contact experienced drillers with own equipment. Will make liberal contract and assist in financing the operations. Box B-758, The Oil and Gas Journal, Tulsa, Okla.

LEASES AND DRILLING BLOCKS

FOR SALE: An ideal flooding proposition. 34 wells 200 feet deep equipped for pumping, with ten intake wells already drilled and cemented to sand. Oil 34 gravity. Pipe line connections. Plenty of suitable water available. Property must be sold. Address: W. H. Robins, Owner, 4526 West Broadway, Muskogee, Okla.

FOR SALE: New state oil and gas leases, Lea, Eddy and San Juan counties, New Mexico. Easy payments—free map and circulars. Wm. C. Uphoff, Box 703, Peoria, Ill.

FOR SALE: Oil lease with 4 producing wells in Viola Lime, approximately 3100' depth—in Butler County, Kansas. Write P.O. Box 13, Pittsburg, Kansas.

NEW MEXICO
State Oil and Gas Leases

TWO DEEP TESTS UNDER WAY—one a 7,500 ft. test; the other a 6,000 ft. test. 40 acres and multiples thereof for sale in the HoT SPoT. Write for information. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, New Mexico.

FOR SALE: 10 acres in Johnston, Sequoyah, Cherokee and Pittsburg counties, Oklahoma. Barry. 3505 Legation St N.W., Washington 15, D. C.

FOR SALE oil and gas lease on structure, or part furnished for drilling contracts, also proven tracts of fluorspar. W. P. Harley, Bowling Green, Ky.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

30 Years' Experience

Inquiries Invited.

B. D BUCKLEY
60 Broadview Drive, Clayton St. Louis, Mo.

ROYALTIES

I OFFER large production royalties in Pecos County, Texas. John Stouppas, 522 W. Broad St., Columbus, Ohio.

BUSINESS OPPORTUNITIES

AS A HEDGE AGAINST INFLATION would you like to mine: copper? lead? zinc? silver? gold? If so, please write me what you want. Maybe I can supply it. Guy L. V. Emerson, Midland Savings Bldg., Denver, Colo.

OIL MUD SCREENS

The manufacturer of well-known equipment of proven efficiency for industrial uses of similar characteristics now operating at capacity willing to grant license on reasonable royalty or lump-sum basis to established manufacturer of oil-field equipment for manufacture, use, and sale in that field of modifications specially adapted to particular purpose. Shop drawings and other manufacturing information available will minimize if not eliminate usual development expense. Box B-752, The Oil and Gas Journal, Tulsa, Okla.

SOUTHWEST MANUFACTURER'S AGENCY

serving war plant and industrial accounts in Kansas, Oklahoma, Western Arkansas and Texas wants an additional line of meritorious products. Opportunity for reliable manufacturer to maintain profitable present and post war business in this area at minimum expense and in spite of MANPOWER SHORTAGE. Technically trained personnel, financial responsibility, and small warehouse facilities available. Write, giving full details of your company, products, and market. All inquiries will be answered and treated with absolute confidence. Address Box B-772, The Oil and Gas Journal, Tulsa, Okla.

ADVERTISERS IN THIS ISSUE

Air Reduction Sales Co. 1
Alco Products Division of American Locomotive Company 6
Alcorn Combustion Co. 84
Allied Steel Products Corp. 128
American Cable Division of American Chain & Cable Co., Inc. ..... Inside Back Cover
American Roller Bearing Co. 117
American Well & Prospecting Co. 19
Armstrong Machine Works 35
Baash-Ross Tool Company 9
Babcock & Wilcox Tube Company, The 92
Baker Oil Tools, Inc. 42
Baroid Sales Division, National Lead Company 71
Barret, Inc., William M. 131
Bethlehem Steel Co. 33
Bowser & Co., Inc., S. F. 132
Brewster Company, The 130
Briggs & Stratton Corp. 81
Brown & Brown, Inc. 104
Brown Instrument Co., The 18
Byron Jackson Co. ..... Front Cover
Cameron Iron Works, Inc. 85
Cast Iron Pipe Research Association, The 67
Chiksan Tool Co. 126
Clark Brothers Company, Inc. 72
Classified Advertising 141-142-143
Cleveland Trencher Company 125
Climax Engineering Co. 106
Consolidated Engineering Corp. 26
Continental Supply Company, The 80
Cooper-Bessemer Corp., The 80-81
Crutcher-Rolfs-Cummings 104
Darling Valve & Mfg. Co. 2
Dravo Corp. 102
Elliott Company 102
Enardo Foundry and Mfg. Co. 116
Ensign Carburetor Company, Ltd. 119
First National Bank & Trust Co. of Tulsa, The 114
Floridin Company, Inc. 121
Franks Mfg. Co. 39
Gasoline Plant Construction Corp. 77
General American Transportation Corporation—Plate & Welding Division .. 121
Grancell, I. H. 131
Guiberson Corporation 98
Gustin-Bacon Mfg. Co. 16A-16B
Haering & Co., Inc., D. W. 119
Hanlon-Waters, Inc. 37
Houdry Process Corp. 34
Hudson Engineering Corp. 12-13
Hughes Tool Co. ..... Back Cover
International Nickel Co., Inc., The 40
Jerguson Gage & Valve Co. 124
Keuffel & Esser Co. 122
Kidde & Company, Inc., Walter 17
Landis Machine Company, Inc. 11
Lane-Wells Company 25
Larkin Packer Company, Inc. 62
Levingston Shipbuilding Co. 89
Link-Belt Company 3
Lummus Co., The 32A-32B
McCord Radiator & Mfg. Co. 105
McCullough Tool Co. 110
McKee & Company, Arthur G. 16
Marley Company, The 4-5
Master Rule Mfg. Co., Inc. 121
Maxim Silencer Company, The 31
Mercoid Corporation, The 127
Mission Mfg. Co., The 113
National Airoil Burner Co., Inc. 130
National Bank of Tulsa 109
National Tube Co. 20-21
Ohio Steel Foundry Co., The 28-29
Open Steel Flooring Institute, Inc. 30
Otis Pressure Control, Inc. 24
Parkersburg Rig & Reel Co. 135
Patterson-Ballagh Corporation 120
Penberthy Injector Co. 61
Perco Division of Phillips Petroleum Co. 75
Petro-Chem Development Co., Inc. 68
Pittsburgh-Des Moines Steel Company 110
Pittsburgh Equitable Meter Co. ..... Inside Front Cover
Pittsburgh Steel Company 78
Products Mfg. Co. 130
Reed Roller Bit Company 96
Reilly Tar & Chemical Corp. 105
Rochester Ropes 23
Rockford Drilling Machine Division of Borg-Warner Company 122
Ryerson & Son, Inc., Joseph T. 131
Schlumberger Well Surveying Corporation 15
Southern Mill & Mfg. Co. 22
Sperry-Sun Well Surveying Co. 90
Standard Steel Corp. 36
Sturtevant Co., B. F. 103
Taylor Forge & Pipe Works 14
Texas Pipe Bending Co. 102
Texasteel Manufacturing Co. 27
Thomas Flexible Coupling Co. 115
Thompson Products, Inc. 127
Thornhill-Craver Co. 130
Timken Roller Bearing Company, Steel and Tube Division 94
Trefolite Company 32
United Construction Co. 104
Universal Atlas Cement Co. 7
Universal Oil Products Co. 64
Van der Horst Corp. of America 10
Vogt Machine Co., Henry 96
Wagner Electric Corporation 8
Weatherford Spring Co. 131
Western Supply Co. 83
Westinghouse Electric & Mfg. Co. ... 86-87
Wheatley Pump & Valve Mfr., Frank 100
Wheeling Machine Products Company 127
Wisconsin Motor Corporation 98
Zink, John, Co. 123

Journalisms:

IN the September 4 issue a 10-article series will begin, authored by C. R. Wagner, internationally known authority on refining technology. This series will be a complete summary and resume of the art and technology of cracking, including the older thermal processes and a thorough introduction to the newer, still rapidly developing catalytic cracking technology. The author is widely known in this field, pioneered many of the important thermal cracking developments, and the series of articles will cover the subject in the most authoritative manner.

The series will include discussion, with numerous charts and graphs illustrating the earlier discoveries in cracking; coke deposition and theory of its cause and the reactions involved; cracking reactions and thermal balances in cracking; cracking rates and gasoline formation; development, theory and practice of catalytic cracking; reforming light hydrocarbons; gas formation in cracking, etc. The series will be condensed and crammed with last-word information and will be an indispensable addition to the cracking literature.

REQUESTS for reprints of the article, "Viscosimetry and New Graphical Viscosity Classifications," published in the July 15 issue are being received daily by the Journal and by the authors. The comment of one reader is typical: "Without doubt, it is the best summation and discussion of the subject I have ever seen."

Said one of the authors: "We feel that a large part of this success is undoubtedly due to the fine presentation of the article and charts by The Oil and Gas Journal." Reprints are still available from the authors, C. M. Larson and W. C. Schwaderer, Sinclair Refining Co., 630 Fifth Avenue, New York, N. Y.

A NUMBER of engineers and field geologists have asked if it is permissible to use Journalog forms for making well records. Others have said that they were already doing so. The Journalog was devised by members of the Journal's staff as a means of recording all significant data needed by operators, engineers and contractors in drilling wells in all parts of the United States. To restrict the use of this form to publication in the Journal would partially defeat its purpose. Space does not permit us to publish Journalogs on more than discovery wells and if engineers are compelled to record their data on subsequent wells on different forms, direct comparisons are difficult. The Journal is happy to know that this log form is being widely used and hopes that as time goes on an increasing number of engineers will make use of it as a standardized form for recording drilling data.

CALENDAR

September

AMERICAN CHEMICAL SOCIETY petroleum division, fall meeting, September 6-10, Pittsburgh, Pa.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf Astoria Hotel, New York City, September 21-22